

# The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. LI  
NO. 1307

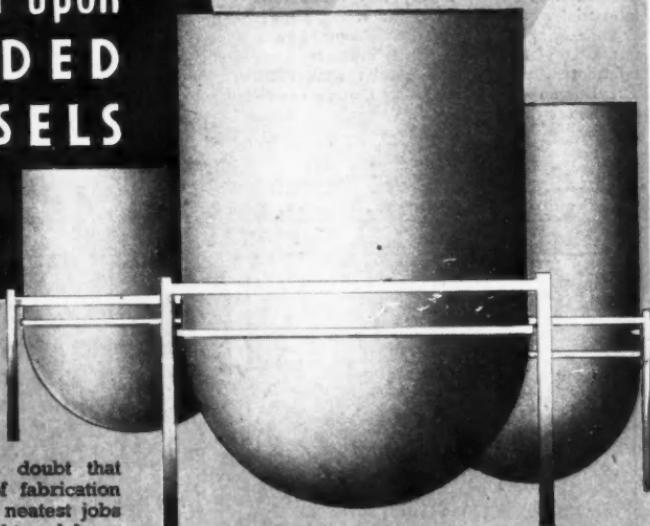
SATURDAY, JULY 15, 1944  
REGISTERED AS A NEWSPAPER

6D. PER COPY  
POST FREE 8D.

AUG 1 1944

DETROIT

You can  
depend upon  
**WELDED  
VESSELS**



There can be no doubt that welded methods of fabrication give the strongest, neatest jobs — gas and liquid tight and free from attack by corrosion.

We specialise in the manufacture of all kinds of chemical vessels and equipment, including large and small storage tanks, by welded methods.

# OXLEY

ENGINEERING CO., LTD. HUNSLET, LEEDS 10.

Tel.: 27468 (3 lines). Grams: "Oxbros, Leeds."



METAL  
SURGERY

London Office: Winchester House, Old Broad St., E.C.2. Telephone: London Wall 3731. Grams: "Asbengpro, Stock, London."

## When is an apple ripe?

If an apple is picked for storage before reaching a certain stage of ripeness it is liable to develop a disease known as bitter pit. That is why, in some countries, the apple growers prohibit the exportation of immature fruit, lest their reputation suffer abroad. In order to determine the right time to harvest, an apple is sliced in half and the exposed part treated with a solution of potassium iodide and iodine. If the apple is completely ripe, no change in colour appears. The various stages of immaturity are accurately registered by changes in the colour of the cross section. Iodine is used by veterinary surgeons, photographers, engineers, opticians, and even by gamekeepers in the rearing of pheasants. There is hardly any commercial or industrial organization which does not, knowingly or unknowingly, employ iodine in some of its many forms. If you have an iodine problem, write for information to the IODINE EDUCATIONAL BUREAU. The Bureau exists to help you, and its advisory services are free.



**Iodine Educational Bureau**

12 STONE HOUSE, BISHOPS GATE, LONDON, E.C.2

"Everything for Safety Everywhere"

### GAS MASKS —ALL TYPES

Self-Contained  
Breathing  
Apparatus  
"Proto,"  
"Salvo,"  
"Fireox," etc.



Short-Distance Breathing  
Apparatus  
"Antipox," and other types



OXYGEN and  
OXYGEN + CO<sub>2</sub>

Resuscitation  
Apparatus  
"Novox,"  
"Novita,"  
and other types

DUST MASKS and GOGGLES of all patterns  
ASBESTOS FIREPROOF CLOTHING, ACIDPROOF  
GARMENTS, etc.

**SIEBE, GORMAN & CO. LTD., LONDON**

Telegrams :  
Siebe, Lamb, London

Telephone :  
Waterloo 6071

## Braby STEEL DRUMS



These drums are welded  
throughout and are  
manufactured in large  
quantities. They can be  
supplied painted, gal-  
vanised or tinned.

Also manufactured in  
stainless steel. Capac-  
ties ranging from 20 to  
150 gallons.

**FRED<sup>K</sup> BRABY & CO. LTD.**

AINTREE LIVERPOOL 10  
'GRANS' BRABY, PHONE, LIVERPOOL - PHONE, AINtree 1722 (6 lines)  
AND AT LONDON, DEPTFORD, BRISTOL, GLASGOW E.16

STEAM & WATER FITTINGS FOR ALL  
PURPOSES



## TRIONITE VALVES

ENSURE THE MAXIMUM OF EFFICIENCY  
TOGETHER WITH LONG LIFE UNDER  
ALL WORKING CONDITIONS

Also SAND CASTINGS IN ALL NON-FERROUS METALS  
INCLUDING HIGH TENSILE BRONZE & ALUMINIUM

Trionite Ltd., Cliffe Vale, Stoke-on-Trent

PHONE : STOKE-ON-TRENT 2171-2





# REFINING PLANTS

## ★ FOR THE TREATMENT OF OILS AND FATS

HIGHEST GRADE OF PRODUCT · LOWEST REFINING LOSSES  
MAXIMUM CONTROL AND FLEXIBILITY IN OPERATION

COMPLETE FACTORY INSTALLATIONS FOR THE PROCESSING OF  
ANIMAL, VEGETABLE AND MARINE OILS & FATS

**BAMAG**  
BAMAG LIMITED

UNIVERSAL HOUSE, 60 BUCKINGHAM PALACE RD., LONDON, S.W.1.  
On War Office and Admiralty Lists.

Telephone, Sloane 9282

9b

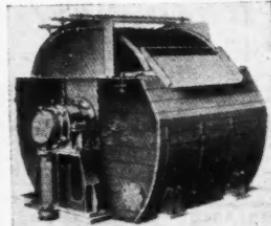
**UNIFLOC**  
REGD. TRADE MARK

## Plant for the Chemical Industry

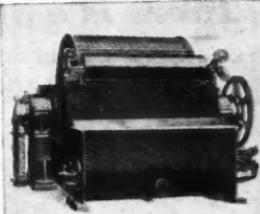
for ACID NEUTRALIZATION, CLARIFICATION OF LIQUIDS,  
DEWATERING OF SLUDGES, EFFLUENT PURIFICATION,  
FILTRATION AND FLOCCULATION, PICKLING LIQUOR  
TREATMENT, PURIFICATION OF TRADE WASTE, SEDI-  
MENTATION AND THICK-  
ENING, SEPARATION OF  
SOLIDS FROM LIQUIDS,  
SODA RECOVERY, WET  
MATERIAL HANDLING

Including

AGITATORS, CAUSTICIZ-  
ERS, CLARIFIERS, CLASS-  
IFIERS, CONVEYORS,  
DEWATERING MACHINES  
ROTARY VACUUM FIL-  
TERS, SAND WASHERS,  
SLUDGE PUMPS,  
THICKENERS, etc.



Rotary Pulp Washing Machine, with  
Pitch Pine Trough, Wash Gear and  
Scraper Knife.



Rotary Vacuum Filler, with Take-off  
Roller and Repulper.

**UNIFLOC REAGENTS LTD.,**  
— SWANSEA —

Phone : Swansea 5164  
(3 lines)

Grams : Unifloc, Swansea

## Safety First

### SAFETY FIRST

THE "OLDBURY" PATENT CARBOY DISCHARGER will empty and elevate up to 50 feet the contents of any carboy, bottle or vessel, and complies with all the conditions of the Factory Act of 1937.

KESTNER EVAPORATOR & ENGINEERING CO., LTD.

5, Grosvenor Gardens, Westminster, London, S.W.

DERMATITIS costs so **MUCH.**

... and

**Sternocleanse SO LITTLE**

SKIN SCREEN AGAINST DERMATITIS

STERNOL LTD., FINSBURY SQ., LONDON, E.C.2

Write Industrial Specialities Dept. 31

## INDUSTRIAL DERMATITIS

accounts for the majority of the cases of industrial disease occurring in the factories annually and these can be prevented (*Min. Lab. & Nat. Serv.*)

**TO AVOID WASTAGE OF LABOUR IS A NATIONAL DUTY**

# ROZALEX

is the barrier substance for the prevention of dermatitis and has given satisfaction to thousands of firms for many years.



***There is a grade for every trade***

ROZALEX LIMITED 10 NORFOLK STREET MANCHESTER 2

First Aid Outfits, etc., complying with new Factory Regulations. Factory Thermometers, etc.

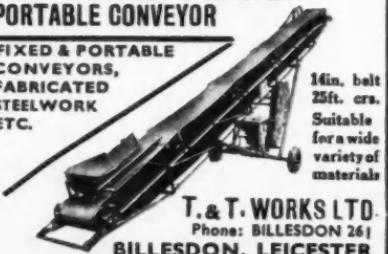
**FIRST AID SUPPLY CO. 1925.**

98, Newington Butts, London, S.E. 11

Telephone: REliance 1823

THE "TEANTEE" STANDARD PORTABLE CONVEYOR

FIXED & PORTABLE CONVEYORS,  
FABRICATED STEELWORK ETC.



T. & T. WORKS LTD.

Phone: BILLESDON 261

BILLESDON, LEICESTER

14 in. belt  
25 ft. crs.  
Suitable  
for a wide  
variety of  
materials

# Safety First

## regarding foam



The fire extinguishing foam produced by Foamite Extinguishers is tough and durable. It resists heat and flame.

Firefoam Stabiliser, the special chemical used in Foamite equipment, is responsible for these properties.

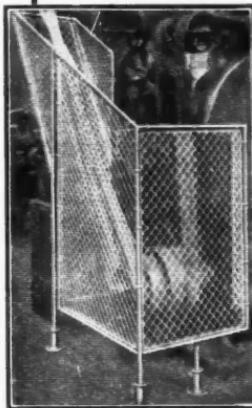
Send for booklet

**FOAMITE LTD.**  
LANGLEY  
BUCKS.

Telephone : LANGLEY 291      Telegrams : FOAMITE-SLOUGH

## Safety First

### POTTER'S Machinery Guards



- DESIGNED FOR SAFETY
- BUILT FOR SERVICE

Potter's guards are installed in works throughout the country and are distinguishable by their sound construction, good fitting and many exclusive features.

**F. W. POTTER & SOAR LTD**

PRINCE STREET, LONDON, E.C.2  
Telephones : BISHOPSgate 2177 (3 lines)

"EVER TRUST  
Y" INDUSTRIAL  
SAFETY  
EQUIPMENT



RESPIRATORS AND GAS MASKS  
GLOVES FOR EVERY INDUSTRIAL  
REQUIREMENT - GOGGLES, SPEC-  
TACLES AND WELDING SHIELDS

Safety Belts and Hoisting Apparatus. Grinding Machine and Shafting Guards. Asbestos Clothing for Fire Protection. Stretchers and First Aid Equipment.

Write to-day for a copy of our "Blue Book for Safety Appliances"—the result of fifty years' experience in protecting industry.

**WALLACH LTD.**

49 - TABERNACLE ST. LONDON E.C.1  
Clerkenwell 14489

**NEW!**  
**CRYSTALLISATION**  
*by*  
**ATOMISATION**  
 A Patent process for  
 crystallising industrial  
 liquors embodying in-  
 teresting new principles.

**KESTNER**  
**LABORATORY**  
**EQUIPMENT**

*Indispensable to the Modern Chemist*

The **KESTNER FLEXO MIXER** is a small machine for general stirring and mixing problems. It has a speed control giving a range from slow speed up to 2,000 r.p.m. It has a flexible driving shaft, and the stirrer blades are made to suit all conditions. The driving motor is kept well clear of steam or corrosive fumes, arising from the mixing vessel. Write for Leaflet No. 255.

The **KESTNER VIBRO MIXER AND SIFTER**, a laboratory apparatus for mixing liquids and solids, grading, sieving, or separating powdered or granular solids, by means of vibration at any required periodicity. Write for Leaflet No. 253.

The **KESTNER LABORATORY SPRAY DRIER**. This is a Kestner Patent Small Scale Spray Drier which produces a dry powdered product of uniform texture in one operation from solutions or suspensions. It is specially arranged for easy cleaning and is suitable for handling a wide range of products. Each unit is complete with heater, fan, dust collector, driving motor, and all necessary equipment. Write for Spray Drier Leaflet No. 264.

The **KESTNER LABORATORY EVAPORATOR** has all the unique features of the full-size Kestner Patent Multi-Circulation Evaporator. This small evaporator is so arranged that it may be used as a single, double- or triple-circulation unit, making it particularly suitable for experimental work. Write for Leaflet No. 259.

**KESTNER EVAPORATOR & ENGINEERING Co., Ltd.**  
 5 GROSVENOR GARDENS LONDON, S.W.1  
 Chemical Engineers

**PROGRESSIVE WELDING** *With* **DONA** BRAND



De-oxidized non-arsenical Copper Tubes and Sheets ("Dona" Brand) specially produced to facilitate Copper Welding Operations.

**HATFIELD**  
  
**THE BIRMINGHAM BATTERY & METAL CO. LTD.**  
 SELLY OAK BIRMINGHAM 29

# SHUTTER VENTILATION

for instant clearance of

## FUMES AND SMOKE

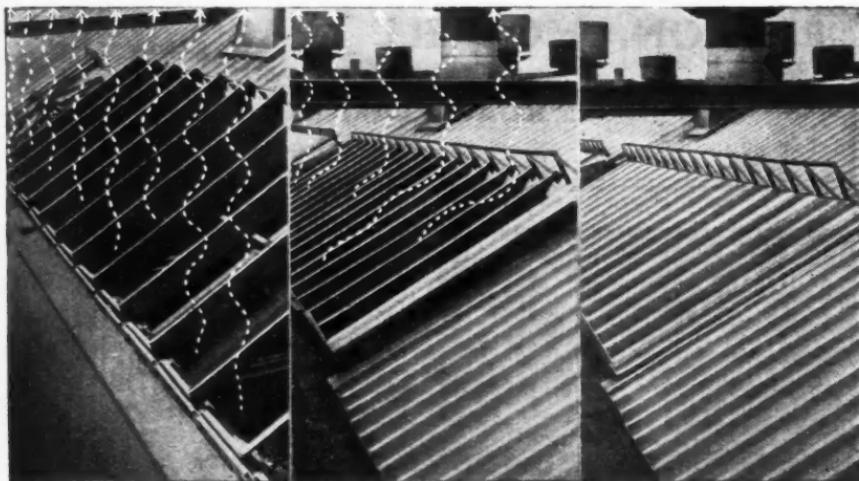
from Foundries, Retort Houses, Furnace Buildings, etc., etc.

The Shutters provide what is in effect a moveable roof to the building which, by means of steel louvres in themselves forming extraction vanes, create extraction draught. The louvres are formed on both sides of a centrally operated dual gear unit; each side can be operated independently in order

to facilitate extraction in strong winds. In very wet weather, driving snow and at night they can be closed and form complete weather-tightness and light obscuration.

Adequate natural light to the workshops below is available when the shutters are open.

BRITISH PATENT NOS. 536127, 536942 AND 536943



### OPEN

When fully opened, the specially designed louvres provide an almost instantaneous clearance of fumes, smoke etc., and, what is equally important, give adequate natural lighting to the workshops below.

### HALF OPEN

It is often dangerous for rain to fall through the open roof of a workshop. In very light rain Hills Shutters can be partly closed and still permit a very high percentage of extraction.

### CLOSED

In driving rain, sleet, etc., the Shutters can be closed down completely and they are then weather-tight. The closing also provides light obscuration for blackout.

# HILLS

**HILLS PATENT GLAZING COMPANY LIMITED**

ALBION ROAD, WEST BROMWICH. 'PHONE : WEST BROMWICH 1025 (6 lines)

London Office War Address : 24, HEATH HURST ROAD, HAMPSTEAD, N.W.3. 'Phone : HAMPSTEAD 0700

# B AR B I T O N E

AND

# B AR B I T O N E S O L U B L E

FINEST QUALITY.

ACTUALLY MANUFACTURED AT BARNET

by

**PIERSON, MORRELL & CO., LTD.**

(THE ORIGINAL BRITISH ASPIRIN MAKERS)

QUEEN'S ROAD - BARNET - HERTS

Phone : Barnet 0723

Grams : Pierson, Morrell, Barnet

PRECISION  
TURNED &  
SCREWED  
REPETITION  
WORK IN ALL  
METALS

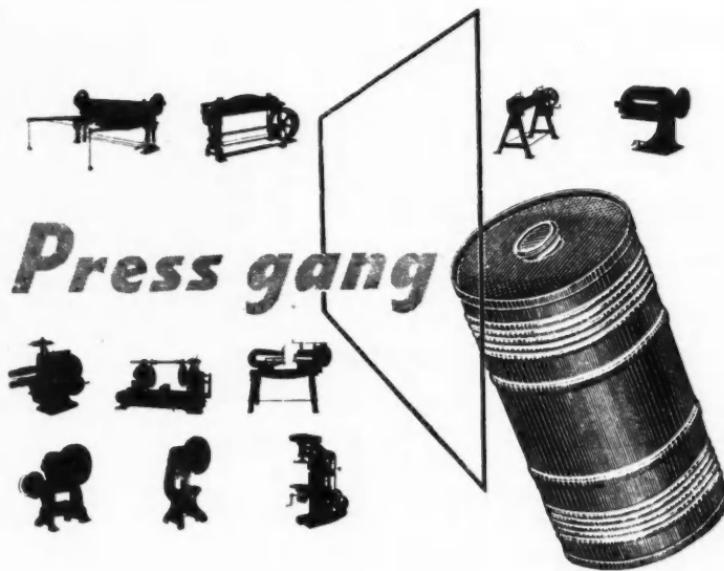
•  
ON AIR MINISTRY  
ADMIRALTY &  
WAR OFFICE  
LISTS

•  
PHONE:  
NOTTINGHAM  
46068 (3 Lines)

•  
GRAMS:  
CAPSTAN,  
NOTTINGHAM

**CASTLE** ENGINEERING CO.,  
(NOTTINGHAM) LTD.

HASLAM ST., CASTLE BOULEVARD, NOTTINGHAM



From the sheet to a finished container involves as little as eleven operations. Each one, from the initial blanking, is carried out with speed and automatic precision by this gang of ten MOON machines. These complete plants have been installed by us in many parts of the world. As a team, they win both at home and away, and they embody every desirable feature which has arisen in a very highly specialised experience of drum making over many years.

—Can they be pressed into service for you?

# MOON

MOON BROTHERS LIMITED  
BEAUFORT ROAD, BIRKENHEAD

We make a very wide range of machines in addition, and we can offer a solution to every problem of metal container manufacture. If your post-war plans include this subject, don't hesitate to ask our advice.

MANUFACTURERS OF TIN BOX & DRUM MAKING MACHINERY

THE HEART OF ENGLAND IS THE HOME OF LIMESTONE

# LIMESTONE

of the highest chemical purity for all

CHEMICAL AND INDUSTRIAL  
PURPOSES

LUMP • CRUSHED • POWDER

The geographical distribution of our many quarries ensures efficient delivery service over a wide area at economical rates.

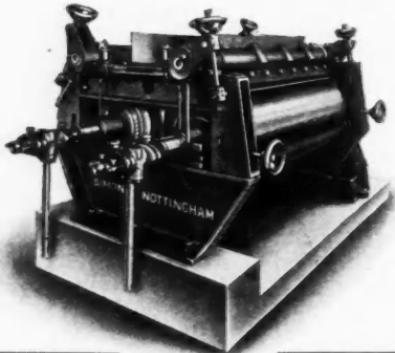


## DERBYSHIRE STONE LTD

BANK HOUSE, THE BRIDGE, MATLOCK Telephone Matlock 396



### MULTITUBULAR DRIERS ROLLER FILM DRIERS FLAKERS AND COOLERS



We offer accumulated experience of 50 years' specialization.

OUR WORKS, the largest in the United Kingdom devoted especially to DRYING MACHINERY, are laid out and equipped with the latest plant for this particular purpose.

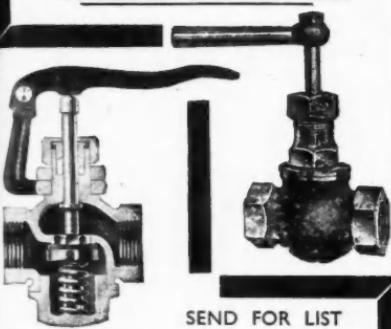
MANY STANDARD SIZES including LABORATORY MODELS.

We have test plants on a commercial scale always available

**RICHARD SIMON & SONS, LTD.**

PHOENIX WORKS, BASFORD, NOTTINGHAM

**VALVES, OF ALL TYPES IN ALL METALS FOR CHEMICAL DUTIES**



SEND FOR LIST

**BRITISH STEAM SPECIALTIES Ltd**

WHARF STREET, LEICESTER

ALSO AT

LONDON, LIVERPOOL, GLASGOW, BRISTOL,  
MANCHESTER, NEWCASTLE-ON-TYNE

**HIGH VACUUM**

FOR SUCCESSFUL AND ECONOMICAL OPERATION OF MANY PRESENT-DAY INDUSTRIAL PROCESSES THE GENERATION AND MAINTENANCE OF A HIGH VACUUM IS IMPERATIVE AND THE CLOSER THE APPROACH TO AN ABSOLUTE VACUUM IN MANY OF THESE PROCESSES THE MORE SUCCESSFUL THE OPERATION.

The MIRRLEES WATSON COMPANY have specialised for many years in the manufacture of equipment to meet the needs of industry in this direction progressively modifying and improving their products until to-day they are supplying vacuum creating STEAM EJECTOR AIR PUMPS capable of successfully maintaining vacua within 5 mm. of Absolute in large scale industrial processes.

THE COST OF MAINTENANCE OF SUCH EQUIPMENT IS NEGLECTABLE AS THERE ARE NO MOVING PARTS TO GO WRONG—JUST WHAT THE MAINTENANCE ENGINEER IS LOOKING FOR !

Engineers and Industrial Chemists are invited to write for information regarding their especial problems which will receive our expert consideration and we will be pleased to advise accordingly.

We also manufacture Reciprocating and Rotary Air Pumps. These have their special applications.

**H. PRATT, LTD.**

**LEAD BURNERS.**

Coils,  
Lutes,  
Vats,  
Chambers  
and every description  
of Chemical Leadwork.  
Specialised attention  
with practical and  
long experience is  
at Your Service.

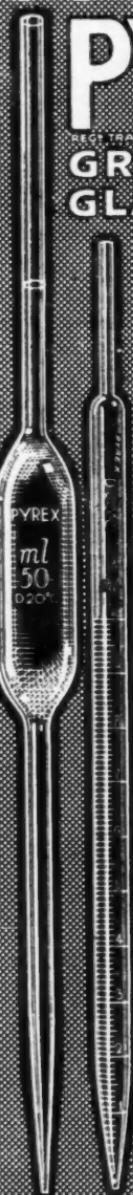
Potters Lane, Aston, Birmingham, 6.  
Telephone:  
Aston Cross, 2141-2  
Telegams:  
"Sanivent."

HPLTD HPLTD HPLTD

**MIRRLEES WATSON**  
SCOTLAND ST. COMPANY LIMITED GLASGOW

**PYREX**  
REG. TRADE MARK  
BRAND

**GRADUATED  
GLASSWARE**



By specifying "PYREX Brand" when ordering Graduated Glassware you are assured of obtaining strong serviceable glassware, with division lines and numerals etched clearly and precisely, for easy reading.

For everyday laboratory work PYREX Brand Glassware is graduated to N. P. L. class B standard, but for more meticulous analysis or intricate research work, N. P. L. class A can be supplied at the appropriate extra costs.

PYREX Brand Graduated Glassware is supplied only through Laboratory Furnishers, but illustrated catalogue and two free copies of our Chemist's Notebook will be sent direct on application to us.

Ask for PYREX Brand and see that you get it!

em

**JAMES A. JOBLING  
& Co. Ltd.  
WEAR GLASS WORKS  
SUNDERLAND**

# ASTON BRASS COMPANY

FOR  
PLUMBERS' BRASSFOUNDRY  
SANITARY BRASS FITTING  
BRASS TAPS AND COCKS

BRITISH



MADE

**ASTON BRASS COMPANY,**  
Proprietors: THE VALOR CO. LTD.  
BROMFORD, ERDINGTON,  
BIRMINGHAM, 24.

# FLUOR SPAR

**HIGH GRADE**

**97.98%**

**CaF<sub>2</sub> CONTENT**

is now available

subject to  
(Ministry of Supply  
licence)

from

**THE GLEBE LEAD MINE  
EYAM · DERBYSHIRE**

Telephone: Eyam 41

**FOUNDED 1830**

Old-established yet up-to-date in every detail, this organisation provides a specialised service for the chemical industry that ensures rapid delivery and low prices all the time

MANUFACTURERS AND PROPRIETORS OF  
**"INVICTA"** DECOLOURISING  
 CARBON

PLUMBAGO CHARCOAL (Wood & Animal) MANGANESE

**"INVICTA"** BITUMINOUS MATERIALS  
 FOR ROAD CONSTRUCTION

**GRINDING** With improved mills, of  
 every description of  
 chemical and other materials for the trade

**THOMAS HILL-JONES, LTD.**

MANUFACTURING CHEMISTS, INVICTA WORKS, BOW COMMON LANE LONDON, E.3.

and at MEESON'S WHARF, BOW BRIDGE, E.15 :: CONTRACTORS TO H.M. GOVERNMENT

Telephone : EAST 3285 (3 lines).

Telegrams : Hill-Jones Bochurh, London

**A. J. RILEY & SON, LTD.**  
**BATLEY, YORKS**

Telegrams: "BOILERS, BATLEY."

Telephone: 657 BATLEY (3 lines),

ESTABLISHED 1888

Makers of

MILD STEEL RIVETED AND  
 WELDED VESSELS

JACKETED PANS COMPLETE  
 WITH AGITATORS

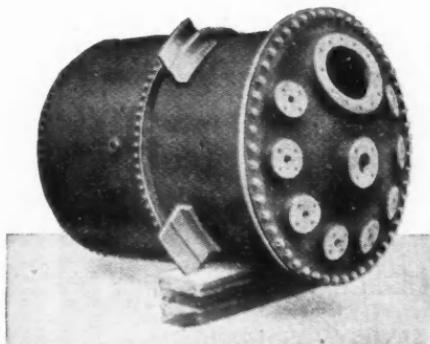
SHEET LEAD OR HOMOGENEOUS  
 LINED VESSELS

TAR, BENZOLE & OIL STILLS

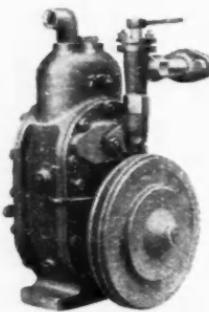
CONDENSERS, EVAPORATORS  
 AND DISTILLING PLANTS

MILD STEEL PIPES  
 ALL PRESSURES

LANCASHIRE, CORNISH  
 ECONOMIC & W.T. BOILERS



**"GERYK"**  
ROTARY OR  
RECIPROCATING



List No  
2777

**VACUUM  
PUMPS**

ESPECIALLY SUITABLE FOR

Condensable Gas Circuits  
Desiccation :: Distillation

HIGHEST POSSIBLE DEGREE OF VACUUM  
CAPACITIES FROM 2 to 250 Cu. Ft. PER MIN.  
SIMPLE CONSTRUCTION :: DURABLE ::  
FAST PUMPING SPEEDS

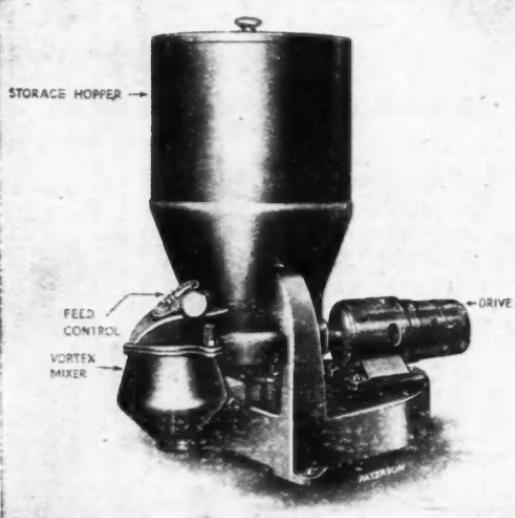
**Pulsometer Engineering C° Ltd.**  
Nine Elms Ironworks, Reading.

**PATERSON DRY CHEMICAL FEEDER**

*Extensively used for the  
application of  
POWDERED REAGENTS  
for Water Treatment  
purposes and for measur-  
ing and proportioning  
powdered or Granular  
Substances.*

*Technical details from*

**PATERSON ENGINEERING CO.,  
Limited**  
83, KINGSWAY, LONDON



# The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

BOUVERIE HOUSE, 154 FLEET STREET, LONDON, E.C.4

Telegrams: ALLANGAS FLEET LONDON

Telephone: CRNTRAL 3212 (10 lines)

GLASGOW: 116 Hope Street (Central 3970)

BIRMINGHAM: Daimler House, Paradise Street (Midland 0784-5)

THE CHEMICAL AGE offices are closed on Saturdays in accordance with the adoption of the five-day week by Benn Brothers Limited.

VOL. LI  
No. 1307.

July 15, 1944

Annual Subscription 21s.  
Overseas 26s.

## Science after the War

WHEN we shyly mentioned in our issue of June 24, that that number marked our Silver Jubilee, we recalled that in the first leading article published by THE CHEMICAL AGE, reference was made to the general feeling that no sufficiently serious attempt had hitherto been made to meet the demands of the chemists of this country. That obviously leads to the inquiry: what are the demands of the chemists? An answer to this question, not only in the name of the chemists, but professedly in the name of all classes of scientific workers, has been attempted in a statement issued by the Association of Scientific Workers entitled *A Post-war Policy for Science*. There are many points which require further examination and we hope to touch upon them at some future date; only the broad outlines of what the scientific workers themselves appear to want can be discussed on this occasion.

How far this body can attempt to speak for scientific men and women generally, is dubious. It has within its membership a number of both qualified and unqualified workers, and it is perhaps an advantage that it is not confined to the purely professional view of the highly qualified. The A.Sc.W. is affiliated to the T.U.C. and claims

that this is an advantage because the links between progressive science and "the whole progressive movement of society" must be strengthened and that "there is already one powerful link in the affiliation of the A.Sc.W. to the T.U.C." This implication that only the T.U.C. is progressive is too naive to provoke more than a smile, but in assessing the views of the A.Sc.W. it is well to bear in mind the general bias, evident in this document, against private enterprise. We quote some examples, and shall then dismiss this bias from our consideration of the report. "Although the whole trend of the application of science in recent years has been towards making more raw materials inter-available . . . this trend has been accompanied in industry by fierce competition between different sec-

tions, growth of monopoly in individual sections and with this the retention of obsolescent and obsolete processes, the whole leading to excessive prices." "The methods of rationalisation, which were notorious when applied merely to the increase of profits, have a vital place in a society organised for human good." "There has been . . . an increasing tendency even in time of peace, for universities' research to become more applied

### On Other Pages

Notes and Comments	49
Letter to the Editor	50
Status of the Fine Chemical Industry—II	51
Society of Chemical Industry	55
Spanish Fertiliser Trade	56
Revised British Standard	56
Fire Prevention: Some Random Wisdom	57
Preventing Fire Wastage	58
Heating Plastics by Induction	58
Dangers of Chrome	59
Newfoundland's Minerals	59
Parliamentary Topics	60
Chance Memorial Lecture	62
Welding Aluminium Bronzes	62
Adsorption of Gases and Vapours	63
Personal Notes	65
Aluminium Alloys in Building	65
General News from Week to Week	66
Stocks and Shares	68
British Chemical Prices	70

than fundamental, and so directed to the profit of private industry." "Leading university scientists must not be attached as consultants or otherwise to individual commercial undertakings." "It is doubtful to what extent State assistance in the form of tax remission is justifiable for development of private industrial scientific work." The obvious dislike of profits—for other people—prompts the inquiry as to what scientific workers live on. Unless someone makes profits, they, like other people, will find themselves in a difficult position on and immediately after pay-day. Perhaps, however, the A.Sc.W. is hoping that its members will form part of a State Scientific Service.

If we endeavour to dissociate our minds from this bias, there is a good deal of sense in the Association's proposals. It would have been wise if the A.Sc.W. had defined what it means by "Science." There is throughout the document a demand that "Science" shall be applied in certain directions, the main objective being "the fullest use of science to meet the needs of the people." We will assume that the word is not used in the narrow sense of the employment of members of the A.Sc.W., but in the widest sense, namely, the application of knowledge to everyday affairs, including industry. We once heard an old-time works' manager describe a visiting team of technical men as " $\pi r^2$  b . . . s," and this attitude to science takes some time to eradicate. The application of science is nothing more than the application of knowledge to decide the best way of doing something. It may be considered as a self-evident maxim that if this country is to be run after the war in a business-like way, providing good conditions of living for all, things must be done in the best possible way. Unfortunately—or is it fortunately?—there is not usually a best possible way, and the consumer (or whatever we may call him) is left to decide between two nicely balanced cases. If we only succeed in sweeping away obvious mistakes, we shall make rapid progress.

Under the heading "What Science Must Do," the A.Sc.W. suggests that industry must be organised to bring everyday practice up to the most efficient standards at present in existence. We should agree with that, only adding that the State must permit industry to make sufficient profits to pay (a) for the im-

mense capital outlay immediately necessary, and (b) for the expense of scrapping plant before it is worn out in order to put in something more efficient. The A.Sc.W. adds that "the problems of nationalisation and of private enterprise also arise here. The claims of private enterprise to a place in the scheme of things can be acceded to only in so far as it demonstrates its ability and its willingness to work for the common end." An impressive list is given of technical problems which "Science" must deal with. These include most of the well-known problems of industry and agriculture, and the only comment to be made is that science is already grappling with them, though perhaps not on a large enough scale, and that many of them involve complicated economic factors. Frankly we do not see in this list anything that is not already well understood, though special mention might be given to the proposal that in this country (as elsewhere) we should take more interest in processes for the extraction of materials from sea water.

In order that these problems should be tackled, science must be organised. Proposals for the organisation of science will doubtless be greeted with violent opposition from those whom it is proposed to organise. The pure scientist has already been heard to demand that he shall not be organised and that he shall be free to pursue whatever researches seem best to him. Industry has its own problems, and undue interference from outside might seriously affect our international competitive power—upon which the "workers" depend for their standard of living. Nevertheless, provided that those who wish to do so (and who are competent to do so) are allowed to work in their own way, it is evident that much would be gained by treating the nation as if it were a limited company. A qualified Board could well decide what problems were not being tackled with sufficient resources and arrange for it to be done. The D.S.I.R. falls a long way short of this ideal, and might with advantage be itself reorganised. The war has shown that with organisation our scientific men are second to none and can quickly achieve results. The outstanding problem appears to us to be: How can we obtain, in peace, results as speedy and as fundamental as those we have obtained in war?

## NOTES AND COMMENTS

### Pure Science

A GOOD word for the pure scientist was spoken by Lord Woolton at a recent meeting on preventive medicine, held at the London School of Hygiene and Tropical Medicine. We are glad to note that the worker engaged on fundamental research is rapidly ceasing to be regarded as little more than a visionary, and that his part in the practical application of scientific knowledge is becoming more fully recognised. As Lord Woolton said, the scientist has "regained" his rightful place in the confidence of the nation; though it has indeed taken a war for survival to scotch the slightly contemptuous attitude of the "practical" man-in-the-street towards the pure scientist. The Minister of Reconstruction reminded us that while the benefits of scientific work might be demonstrated through the engineering shops, the chemical works, or the manufacturing processes of the pharmaceutical chemist, these practical results were all of them derived from the patient study and research of the men engaged in the pursuit of pure knowledge, often without thought of the practical application that would flow from it. Lord Woolton himself then became strictly practical; remarking that, in the past, science, like art, had been left to grow strong in poverty, he pointed out that this was not always a purifying process, and he trusted that the new age would realise that generosity of purse and position was a stimulant to learning. It is our sincere hope that these significant words from a man in his position will be listened to, and followed up, in all circles.

### Black-Out on Penicillin

WHAT a pretty web of mystery the authorities have woven around the subject of large-scale penicillin manufacture! Plenty of stories have been circulated to the Press, detailing how a general practitioner in Llanerchymedd (or elsewhere) grew his own penicillin on a piece of cheese; and the grateful public have even been allowed to see a sample of pure penicillin. But when it comes to a discussion of large-scale manufacture the shutters are pulled down straight away. Pursuing our inquiries into the matter, confident in the

belief that our chemical manufacturers are no less enterprising than their American counterparts, we managed to obtain the statement from I.C.I. that the deep, tank fermentation method of production, as applied in America, is not at present being worked in this country, nor is it certain that it ever will be worked; but, we are told, other methods of large-scale manufacture are being actively pursued, and when news about them is released it will be extremely interesting. We submit that this is all most unsatisfactory, as well as being unfair to the manufacturers themselves. There can be only a limited number of possible processes of manufacture; and most, if not all, of these have been described in American technical journals—not to mention the divagations of the lay Press. It is, we consider, distinctly inadvisable to give cynics and detractors the opportunity of declaring that this secrecy is simply a cloak for inertia.

### International Patents

VISIONS of vast complications float before the eyes at the thought of an International Patent Office, such as has been suggested by a writer in the *Central European Observer*. He uses as an analogy the international system of trade-mark registration which has been in existence for some time at Berne, though he admits that there are many more difficulties involved in the matter of patents. As we know only too well, a national patent system brings troubles enough in its train, and a much greater spirit of universal unity will have to come into being before the corresponding international office is likely to work at all smoothly. Yet there are points about the idea which might be helpful. The office, for example, could, to begin with at any rate, be regarded as a sort of registry where information might be obtained on patents filed in various countries. It is suggested that the official language of the institution should be English, and that the examination department should be internationally staffed. By some such means a certain amount of redundancy might be obviated, and a wider knowledge attained of general trends in the world of technology. But we can foresee grave difficulties

ties when the question of licences of right came up for consideration; and before anything else, a levelling-up of patent law in all countries of the world would have to be arranged. One attractive part of the idea is that Vienna should be the seat of the office, giving that city a revived sense of its own importance.

### Scottish Seaweed

**A** N analogy between the possible course of the seaweed industry and the known development of the cellulose industry was drawn by Mr. E. D. McPhee, managing director of Cefoil, Ltd., at a recent meeting in Edinburgh at which the initial report of the Scottish Seaweed Research Association was discussed with representatives of the Press. Mr. McPhee is a vice-chairman of the new association, which has Sir Steven Bilsland (vice-chairman of the Scottish Council on Industry) as its chairman, and Major Mark Sprot (chairman of the Scottish Agricultural Organisation Society) as its other vice-chairman. Mr. McPhee's analogy was an answer to the question whether some kinds of seaweed were more valuable than others; he pointed out that to-day a large variety of timber was of use in the cellulose industry, whereas before only certain kinds were useful. The principal objective of the Association is to ascertain whether the vast supplies of seaweed available on the Scottish coasts can be developed in such a way as to act as a basis for a domestic industry, and so to check the drift towards Pacific waters of the industries using seaweed chemicals. The Association has been brought into being by the Ministry of Supply and the Scottish Council on Industry, supported by the Scottish Agricultural Organisation Society. Its income will be derived from members, from friends of the industry, and from the Scottish Development Fund.

### A Big New Industry?

**W**ORK will proceed along three main lines. The survey and ecological divisions will note seasonal variations in type and quantity of weed, prepare reports, and correlate the findings of previous surveys. The engineering division will maintain the S.S. *Prospecto*, a ship specially equipped for

the survey and collection of deep-sea weeds, and will develop equipment for landing, pressing, drying, and milling the weed. The chemical division will study seasonal variations in the organic and inorganic constituents of the various weeds, and will provide information both to those engaged in the extraction of chemicals and to those who market the seaweed for feeding-stuffs or fertilisers. Leading scientists and scientific organisations throughout Great Britain have promised their assistance, and the results of the investigations will be submitted to both technical and commercial scrutiny. The first essential is to provide reliable means for location of weeds, both littoral and sublittoral, and to ensure their reproduction in quantity, and then to devise economic engineering methods for dealing with the product. For general harvesting, arrangements would have to be made that would not interfere with crofters' rights; the Board of Trade will keep this aspect in mind. Sir Steven Bilsland has expressed his belief that we are at the beginning of a big new industry in which Scotland would play a leading part. All firms likely to be interested, whether large or small, are invited to join the Association. The secretary is Mr. C. J. M. Cadzow, 28 Rutland Street, Edinburgh.

### LETTER TO THE EDITOR

#### Cellulose Roofing

SIR.—On p. 44 of your issue of July 8 you report under "Foreign News" that a roofing material, based entirely on cellulose, is being made in a new factory started by the Kopings Eternit A.B. in Sweden. It may interest your readers to know that since about 1935 a roofing felt has been manufactured at Ruzomberok, Czechoslovakia, according to a process of Albert Benda; this product was also based entirely on cellulose and was impregnated with bitumen and tar pitch, and was either sprinkled with sand or, without such protection, was treated in the same way as Ruberoid. By the same process a cellulose board was produced for flooring material, which was impregnated and afterwards decorated. So far as we know production in Czechoslovakia continued at least up to the outbreak of war and is very likely still continuing.

—Yours faithfully,

for Franks Laboratories, Ltd.,  
FRITZ FRANK, Director.

# Status of the Fine Chemical Industry

## Financial Position, Trends, and Potentialities—II

by S. HOWARD WITHEY, F.C.I., F.Comm.A., M.I.Ec.E.

THE second part of this article, here with, continues the consideration of the fine chemical industry, and the general expansion it shows as a result of scientific research and progress in chemical engineering processes. The article is continued from p. 33 of our issue of July 8.

### Macleans

Controlled by Beecham Maclean Holdings, Ltd., which is controlled by Beechams Pills, Ltd., Macleans, Ltd., was registered privately nine years ago, and then converted into a public company, the authorised capital being £1,700,000, of which a total of £1,642,553 is in issue. This comprises £692,553 in the form of 6 per cent. cumulative redeemable preference £1 shares—dividend half-yearly in March and September—and £950,000 in ordinary shares of 5s., and during 1942-43 the gross earnings amounted to £363,727. This compares with £416,887 for 1941-42 and £359,241 for 1940-41, and after debiting £197,010 for taxation, compared with £236,868 previously, the balance of net profit was only £13,227 lower at £61,591. The dividend on the ordinary shares was reduced from 30 per cent. to 27 per cent. and £1580 added to the forward balance which now amounts to £7479. Goodwill is shown on the balance sheet at £1,160,957, and recently the preference shares were quoted at 23s. 3d., with the dividend covered nearly eight times.

### Milton Antiseptic

This company is concerned with a variety of products, and directly controls Belle Isle Laboratories, Ltd., Deosan, Ltd., and other firms. Last year the Ministry of Supply compelled the company to reduce the number of the various sizes of containers, but in spite of this Order the public demand has been well maintained, a large proportion of the sales going to the overseas forces. The authorised capital is £200,000, of which a total of £149,998 has been issued and fully paid, comprising £51,922 in the form of 10 per cent. cumulative preference £1 shares—the dividend on which is paid in April and October—and £98,076 in ordinary shares of 10s. The accounts covering the twelve months' operations to September, 1943, disclose gross earnings at £39,893, and a net profit balance of £23,741 after reserving for taxation. This represents a decline of £3271 in relation to the preceding year, but the ordinary dividend of 12½ per cent. is earned more than twice, and the forward

balance increased by £1289, after placing another £5000 to the general reserve.

	£
Brought forward from 1941-42...	78,882
Net Profit: year ended September 30, 1943	23,741
Disposable Balance	£102,623
10 per cent. Dividend on £51,922 Cumulative Preference £1 shares, gross	5,192
12½ per cent. Dividend on £98,076 ordinary 10s. shares, gross	12,260
Transferred to General Reserve	5,000
Carried forward to 1943-44	80,171
	£102,623

The current assets total £163,721, giving a floating surplus of £48,326 over current liabilities, and at the recent price of 28s. 3d. the ordinary share's give a return of nearly 4½ per cent.

### Monsanto Chemicals

Registered in 1934 and owning a direct controlling interest in the British Saccharin Manufacturing Co., Ltd., Monsanto Chemicals, Ltd., has an authorised capital of £800,000 of which a total of £700,000 has been issued and fully paid. This is made up of £400,000 in the form of 5½ per cent. cumulative redeemable preference £1 shares, and £300,000 in ordinary shares of 10s. In 1943, the gross earnings amounted to £620,087, representing an increase of £63,684 over the previous year's figure, and after adding dividends received and other income, and deducting taxation, depreciation, obsolescence and fees, the balance of net profit was £92,781, or an increase of £17,033. This enabled £17,405 to be allocated to the staff pension fund, and it was decided to transfer the sum of £115,000 to an income tax reserve instead of paying a dividend on the ordinary capital. After deducting depreciation and obsolescence, the fixed assets were shown on the balance sheet at £465,879, while the current assets amount to £1,323,398, giving a floating surplus of £590,235 over current liabilities. The preference shares are redeemable at 21s. 6d. on three months' notice at any time before January 1, 1970.

### Joseph Nathan & Co.

During recent years the business in foods and pharmaceutical products transacted by Joseph Nathan & Co., Ltd., has been broadened and specialised, and several important products and articles have been introduced, and in the face of increasing difficulties regarding supplies, packing materials, distribution and labour, good results were again

recorded for the year to September last. The trading profit amounted to £176,555, which figure compares with £174,773 in 1941-42 and £173,081 in 1940-41, and after debiting head office and general administration expenses, taxation, fees, and interest on 4½ per cent. notes, the balance of net profit was £84,298, or an increase of £1366. The ordinary dividend of 10 per cent. less tax was increased to 10 per cent. tax-free, this being earned with a margin of £25,334, of which the general reserve received another £20,000, the carry forward being then raised to £32,985.

Brought forward from 1941-42...	£	27,650
Net Profit : year ended September 30, 1943		84,298
Disposable Balance	£	111,948
7 per cent. Dividend on £500,000 Cumulative "A" preference stock, gross	£	35,000
8 per cent. Dividend on £200,000 Cumulative Preferred ordinary stock, gross	£	16,000
10 per cent. Dividend on £79,635 ordinary stock, tax free	£	7,963
Transferred to General Reserve	£	20,000
Carried forward to 1943-44	£	32,985
	£	111,948

The fixed assets amount to £847,815, and investments £111,121, while the floating assets total £2,117,262, the surplus over current liabilities being £587,143 as compared with £580,528 at September, 1942. The preference £1 units have recently increased in market value from 27s. 6d. to 30s. 7d., and the preferred 10s. units from 13s. 9d. to 15s. 7d., and at 36s. 3d. the ordinary 10s. units return 5½ per cent. gross.

### Prichard & Constance

A trading profit of £42,556 was realised by Prichard & Constance (Manufacturing), Ltd.—a subsidiary of Eno Proprietaries, Ltd.—during the year to March, 1943, and after debiting taxation the net profit was £19,649. This represents an increase of £9628 in relation to 1941-42, and the rate of dividend on the 1s. deferred ordinary shares was reduced from 24 per cent. to 60 per cent. As perfumers and manufacturing and wholesale chemists, this company started in 1926, and the entire authorised capital of £150,000 is in issue, comprising £100,000 in 8 per cent. cumulative preferred ordinary shares of £1—the dividend on which is paid half-yearly—and £50,000 in deferred shares.

Brought forward from 1941-42...	£	5,294
Net Profit : ended March 31, 1943	£	19,649
Disposable Balance	£	24,943
8 per cent. Dividend on £100,000 Cumulative Preferred ordinary £1 shares	£	8,000
Less income tax at 10s. in the £	£	4,000

60 per cent. Dividend on £50,000 Deferred ordinary 1s. shares...	£	30,000
Less income tax at 10s. in the £	£	15,000
Carried forward to 1943-44	£	5,943
	£	24,943

The preferred shares were recently quoted around 21s.

### Sangers

After charging depreciation, the gross earnings of Sangers, Ltd.—wholesale and manufacturing chemists—amounted to £233,317 during the twelve months to April, 1943, and after debiting £116,414 for taxation the balance of net profit was £115,101. This compares with £88,963 in 1941-42 and £111,745 in 1940-41, and enabled the ordinary dividend of 22½ per cent. to be restored, and the forward balance to be increased by £18,667 after placing £9350 to the contingency reserve. The company occupies a very prominent position in the industry, and in 1935 acquired the drug, druggists' sundries and proprietary articles business of Southall Brothers & Barclay, Ltd.—now Southalls (Birmingham), Ltd. The company also owns all the capital of Brooks & Warburton, Ltd.; Cataline Co., Ltd.; Goodalls (Leeds), Ltd.; John Thompson (Wholesale Druggists, 1921), Ltd.; and May, Roberts & Co., Ltd.; also a direct controlling interest in Thomas McMullan & Co., Ltd. The authorised capital is £1,300,000 of which a total of £1,212,750 ranks for dividend, made up of £360,000 in 5½ per cent. cumulative preference stock; £250,000 in 7½ per cent. cumulative preference stock; and £602,750 in ordinary stock.

Brought forward from 1941-42...	£	114,216
Net Profit : year ended April 30, 1943	£	115,101
	£	229,317
5½ per cent. Dividend on £360,000 Cumulative Preference stock	£	19,800
Less income tax at 10s. in the £	£	9,900
7½ per cent. Dividend on £250,000 Cumulative Preference stock	£	18,750
Less income tax at 10s. in the £	£	9,375
22½ per cent. Dividend on £602,750 ordinary stock	£	135,619
Less income tax at 10s. in the £	£	67,810
Transferred to Contingency Reserve	£	9,350
Carried forward to 1943-44	£	132,883
	£	229,317

After charging war damage contributions, and bringing in £30,000 bonus from a subsidiary, the contingency reserve amounts to £125,000, and there is a capital reserve of £500,000. The freeholds are valued at £252,746 and investments in subsidiaries at £1,636,113. During the past five years, the 7½ per cent. preference £1 units have fluctuated between 27s. 3d. and 33s. 3d., and

the ordinary 5s. units between 14s. 6d. and 24s. 4d., thus:—

	1939	1940	1941	1942	1943
Highest	30.3	30.0	30.0	31.2	33.3
Lowest	27.6	27.3	27.6	28.0	30.0
Ordinary					
Highest	22.6	22.8	19.3	20.5	24.4
Lowest	16.9	16.6	14.6	14.9	19.9

Recently, the preference were quoted at 3s., and the ordinary at 25s., on which basis the yield is about 4½ per cent. in each case.

### Savory & Moore

This company was established about 165 years ago and now enjoys a goodwill second to none in the trade, its products being world-famous. During the 14 months ended March, 1943, the gross earnings amounted to £85,450, which compares very favourably with £61,650 for the preceding year and £54,922 for 1940-41, and after debiting general expenses, depreciation and taxation the balance of net profit for the period was £27,844. The uncertainties of the future have influenced the directors to strengthen the reserves by adding £5500 to the general reserve and £10,601 to the forward balance, no dividend being paid on the ordinary shares, the majority of which are owned by the directors. In 1939, the company acquired part of the undertaking of Pharmaceutical Products, Ltd. It directly controls Artificial Limbmakers, Ltd.; G. S. Mascall, Son & Co., Ltd.; and Knoll, Ltd. The entire authorised capital of £460,000 has been issued and paid up, consisting of £47,997 in the form of 6 per cent. cumulative preference £1 shares; £102,003 in 7½ per cent. cumulative participating preference £1 shares; £160,000 in 6 per cent. non-cumulative preference £1 shares; and £150,000 in ordinary £1 shares. The fixed assets are shown on the balance sheet at £568,000, including £308,375 for goodwill and trade marks, and the current assets amount to £436,239 chiefly in the form of stocks and cash. There is not a very active market in the shares, but the 6 per cent. and the 7½ per cent. preference were recently quoted around par, and there is an issue of 5 per cent. first mortgage debenture stock marked at 101.

### Timothy Whites & Taylors

Recently, Mince Smith's Stores (Proprietors) were acquired by Timothy Whites & Taylors, Ltd., which company now operates directly or through subsidiaries nearly 900 branches. Like Boots Pure Drug Co., Ltd., this giant of the retail trade is concerned with the sale of merchandise other than drugs and chemists' sundries, and embraces hardware and fancy goods, etc., and the last accounts disclosed a trading profit of £439,778. This compares with £436,710 in 1941 and £393,129 in 1940, and after de-

biting debenture interest, depreciation, and A.R.P. expenses, and allocating £37,300 for deferred repairs and renewals, and £167,700 for taxation, the balance of net profit was slightly higher at £137,077. Of an authorised capital of £3,176,000, a total of £2,161,793 ranks for dividend, composed of £1,676,000 in 7½ per cent. cumulative preference £1 shares, and £485,793 in ordinary shares of 5s. on which a dividend of 30 per cent. has been maintained.

	£
Brought forward from 1941	76,327
Net Profit: year ended December 31, 1942	137,077
Disposable Balance	£213,404
7½ per cent. Dividend on £1,676,000	
Cumulative Preference £1 shares	£125,700
Less income tax at 10s. in the £	62,850
30 per cent. Dividend on £485,793	
ordinary 5s. shares	£145,739
Less income tax at 10s. in the £	72,869
Carried forward to 1943	£77,685
	£213,404

The fixed assets have a total value of £2,443,834, and investments in subsidiary companies amount to £1,202,796, while the current assets are £1,434,399. There is every indication that the organisation will maintain its position. During the past five years the preference £1 shares have fluctuated between 19s. 9d. and 33s. 8d., and the ordinary 5s. shares between 15s. 2d. and 34s. 3d.

	1939	1940	1941	1942	1943
Highest	28.9	28.9	29.1	32.9	35.8
Lowest	24.3	19.9	24.9	27.9	30.0
Ordinary					
Highest	25.9	26.8	22.2	25.6	34.3
Lowest	16.3	15.2	17.2	17.8	24.6

Recently, both preference and ordinary were quoted at 33s. 6d.

### Veno Drug Co.

Registered in 1925 and having an authorised capital of £770,000, Veno Drug Co., Ltd., is a subsidiary of Beechams Pills, Ltd., and is the proprietor of several brands and preparations, including Cassell and Germolene, and owners of practically all the ordinary shares of Phensic, Ltd. For the year ended March 31, 1943, the gross earnings beat all previous records, and at £589,837 the trading profit and profit on sale of investments represents an increase of £224,563 in relation to the previous year's figure. After debiting £360,666 for taxation, as compared with £163,037 previously, the balance of net profit was £226,421, or £26,934 more than in 1941-42, enabling the dividend on the 1s. deferred shares to be raised from 1s. 9d. per share to 1s. 11d. per share, or from 175 per cent. to 192 per cent. Goodwill, etc., stands on the balance sheet at £503,736, and reserves amount to £321,201,

while the forward balance has been raised by £11,046, thus:—

Brought forward from 1941-42...	£	5,108
Net Profit : year ended March 31, 1943	...	226,421
Disposable Balance	...	£231,529
8 per cent. Dividend on £300,000 Cumulative Preference £1 shares	£24,000	
Less income tax at 10s. in the £	12,000	12,000
12 per cent. Dividend on £275,000 Cumulative Preferred ordinary £1 shares	£33,000	
Less income tax at 10s. in the £	16,500	16,500
192 per cent. Dividend on £195,000 Deferred 1s. shares, less tax	186,875	
Carried forward to 1943-44	...	16,154
		£231,529

Since July, 1943, the preferred shares have advanced from 35s. 6d. to 40s. 7d., at which price the actual return is about 5.9 per cent., and the 8 per cent. preference have risen from 28s. to 30s. 3d., on which basis the yield is more than 5½ per cent., the two dividends being covered eight times.

### Virol

The gross earnings of Virol, Ltd., during the twelve months ended March, 1943, amounted to £120,837, which represents a decline of £14,116 in relation to 1941-42, but after debiting E.P.T., the balance of net profit was higher at £17,059, so that the ordinary dividend of 10 per cent. has been maintained for the thirteenth successive year. The paid-up capital of this company consists of £125,000 in the form of 7 per cent. cumulative preference £1 shares—dividend paid half-yearly—and £75,000 in ordinary £1 shares.

Brought forward from 1941-42...	£	41,839
Net Profit : year ended March 31, 1943	...	17,059
Disposable Balance	...	£58,898
7 per cent. Dividend on £125,000 Cumulative Preference £1 shares, gross	...	8,750
10 per cent. Dividend on £75,000 ordinary £1 shares, gross	...	7,500
Carried forward to 1943-44	...	42,648
		£58,898

The company owns a 50 per cent. interest in Ambrosia, Ltd., and possesses well-equipped works and pathological research laboratories.

### Vitamins, Ltd.

This company caters for the people's nutritional requirements and has a wide range of products, backed by efficient laboratory work. It owns the process and manufacturing rights of "Bemax" and other cereal products, and all the shares of Agricultural Food Products, Ltd., the authorised capital being £100,000, of which a total of £77,800 has been issued in the

form of 1s. shares of one class. After debiting E.P.T., the gross profit during 1942-43 was £61,949, compared with £71,795 for the preceding year, and after tax the net profit was £13,004, compared with £17,029. A dividend of 25 per cent. has been paid for the past three years, and the general reserve has been increased to £33,000.

Brought forward from 1941-42...	£	9,416
Net Profit : year ended March 31, 1943	...	13,004
Disposable Balance	...	£22,420
25 per cent. Dividend on £77,800 shares of 1s.	£19,450	
Less income tax at 10s. in the £	9,725	9,725
Transferred to General Reserve	...	3,000
Carried forward to 1943-44	...	9,695
		£22,420

### Yeast-Vite

During the financial year to March, 1943, the income of Yeast-Vite, Ltd., amounted to £271,210, and after charging taxation the balance of net profit was £134,947, which compares with £159,047 for the preceding twelve months when the income from subsidiaries was £319,351. This company started in 1928, and owns all the shares of Irving's Yeast-Vite, Ltd.; The Ciefa Co., Ltd.; Dinneford & Co., Ltd.; and the Iron Jelloid Co., Ltd. The entire authorised capital of £660,000 has been issued and fully paid, comprising £300,000 in 6½ per cent. cumulative preference £1 shares—the dividend on which is paid half-yearly in January and July—and £360,000 in ordinary £1 shares, the dividend on which has been reduced from 82½ per cent. to 75 per cent.

Brought forward from 1941-42...	£	27,747
Net Profit : year ended March 31, 1943	...	134,947
Disposable Balance	...	£162,221
6½ per cent. Dividend on £300,000 Cumulative Preference £1 shares	£19,500	
Less income tax at 10s. in the £	9,750	9,750
75 per cent. Dividend on £360,000 ordinary £1 shares, less tax	...	125,000
Carried forward to 1943-44	...	27,471
		£162,221

During recent months, the preference shares have risen from 23s. 6d. to 24s. 3d., at which price the actual yield is nearly 5½ per cent. with the dividend covered many times.

Some companies directly connected with the fine chemical industry have not been included in this article owing to the fact that the accounts were not available when it was compiled. These companies will form the subject of an article, when opportunity offers, as will Imperial Chemical Industries, Ltd., whose interests and activities in war materials and in the development of industry and agriculture are so widespread.

# Society of Chemical Industry

## Points from the Annual Report

PARTLY owing to the discouragement of travel, and partly, no doubt, because of the recent enemy action against London, it has been considered advisable to abbreviate the annual meeting of the Society of Chemical Industry on July 14 to a transaction of formal and necessary business. The luncheon and the afternoon proceedings, including tea, are omitted. The business meeting is proceeding as we go to press, and its results will be duly recorded in our next issue. The annual report, however, has already been published, and, as usual, contains many points of interest. Despite the fact that overseas recruitment, except in America, has been reduced to a trickle, the number of members continues to mount. The total on January 1, 1943, was 4921; this has been altered by 273 accessions and 156 deductions, leaving the membership on January 1 this year at the figure of 5250. Following the extension of the joint subscription arrangements to cover junior members and students, the number of new members enrolled during the current year has surpassed all records, and it seems probable that by the end of the year a new high level of membership will have been attained.

### Changes in the Council

The past year's president, Dr. Wallace Cohoe, resigns from his office at the annual meeting, and is to be succeeded by Dr. E. K. Rideal, F.R.S., who has been nominated by the Council. Dr. Rideal automatically retires from the vice-presidency, the other retiring vice-presidents being Dr. H. E. Cox, Dr. T. H. Durrans, and Mr. F. M. Potter. The four vacancies will be filled by the retiring president, *ex officio*, Mr. A. L. Bacharach and Sir Robert Pickard, nominated by the Council, and Dr. William Cullen, the retiring chairman of Council. A special debt of gratitude is acknowledged to Dr. Cullen by the Council, for his invaluable services as chairman during a period of transition in the organisation of the Society, not only as representative of the president in home affairs, but also for the unfailing energy and enthusiasm with which he continued to discharge the duties of acting general secretary until the end of 1943. For the time being the duties of the general secretary will be carried on by Dr. Colgate and Dr. Ellingham, hon. secretaries, and Miss S. Jones has been appointed acting assistant secretary.

Dr. E. K.  
Rideal,  
President  
of the  
Society of  
Chemical  
Industry.



Ordinary members of the Council who retire are: A. L. Bacharach, J. H. Bushill, J. B. Firth, and Foster Sproxton. Six nominations have been received for the four vacancies thus caused and the result of the necessary ballot will be announced at the meeting. Candidates are: C. G. Addingley, J. P. Baxter, J. W. Criggs, J. Vargas Eyre, J. S. Jackson, and J. A. Oriel. The following changes take place among the officers of the Sections and Groups after the meeting:

	Retiring Chairman	New Chairman
Birmingham	C. Diamond	R. S. Potter
Liverpool	A. E. Findley	C. Gordon Smith
Montreal	Dr. A. S. Cook	G. E. Gollop
Severnside	B. P. Hill	Dr. P. L. Robinson
Ottawa	C. E. Watson	A. K. Light
South Wales	Neil Lawson	John Christie
Yorkshire	G. B. Jones	A. Woodmancey
Agriculture	Sir John Russell	Dr. S. J. Watson
Plastics	H. C. Couzens	A. J. Gibson
Road and Building	J. S. Jackson	L. C. Gabriel
	Retiring Secretary	New Secretary
Ottawa	A. K. Light	A. L. Davidson
Agriculture	G. V. Jacks	Dr. A. H. Lewis
Plastics	N. J. L. Megson	Dr. S. H. Bell

### Memorial Lectures

Jubilee Memorial Lecturers for the forthcoming session are Dr. L. A. Jordan (Director of Research, Paint Research Station), and Professor D. T. A. Townend (Livesey Professor of Coal, Gas, and Fuel Industries at Leeds University). Dr. Jordan's lecture is entitled "Paint—the Art and the Science" and will be delivered in London, Liverpool, and Yorkshire. Dr. Townend's subject is "The Present Era in Combustion"; his lecture will be heard in Birmingham and Glasgow.

Good progress has been and is being made with the Endowed Memorial Lectures, the inception of which was announced at last year's meeting. Four of these lectures have already been delivered—the latest being the "Chance" Lecture at the end of last month—and arrangements are in hand for four more. The "Lister" lecture, on

Antiseptics, will be delivered in Edinburgh, on November 9, by Sir Alexander Fleming; the "Baekeland," is to be delivered in London by Mr. H. V. Potter early in 1945; the "H. E. Armstrong," postponed from 1944 at the request of the lecturer, Sir Harold Hartley, will take place also in London early next year. Fuller particulars concerning the "J. T. Dunn" (Newcastle) lecture will be forthcoming shortly.

## Spanish Fertiliser Trade

### Nitrate Imports

**I**N a recent issue of *Ion* (Spanish Review of Applied Chemistry) Señor Ortiz de Montvíl gives details of Spanish trade in fertilisers in 1943. He points out that in a previous article on the subject towards the end of 1942 he had expressed the view that the following year (1943) would witness considerable expansion of imports and distribution of fertiliser—a matter of vital importance to Spanish agriculture and national economy generally—and is pleased to note that his optimistic forecasts have been realised.

For ammonium sulphate during the year licences were granted for the importation of 88,850 tons, against which the actual import was 76,437 tons. Of this amount 10,000 tons came from Italy, nearly 40,000 tons from the U.S.A., and the balance from Germany. The total in 1942 was only 25,000 tons. Home production was maintained at about 20,000 tons, of which 16,000 tons were destined for agriculture and the remainder for manufacturing industries. The principal Spanish producers are the Altos Hornos de Vizcaya and Energia e Industrias Aragonesas S.A.

Imports of Chilean nitrate, though licensed up to 68,400 tons, only reached 28,000 tons by the end of the year; some 40,000 tons were on the way and were expected at Spanish ports early in 1944. In normal years Spanish imports of nitrate have averaged 120,000 tons per annum.

In regard to nitrate of lime, the figure for 1943 (7500 tons) remained about the same as 1942. The supplying countries were Hungary and Switzerland. Imports of calcium cyanamide, however, showed a substantial decline—7850 tons in 1943, as against 11,260 tons in 1942—though the quality is said to be better and also safer to use, being in the granulated form instead of powdered.

A remarkable increase in imports of ammonium nitrate was shown in 1943 as compared with 1942, the greater part coming from the U.S.A. In 1942, the only shipment of importance was one of 500 tons from Italy, at the price of 3500 lire, c.i.f. Barcelona. In 1943, this amount from Italy was doubled, and 25,647 tons in addition

were received from the U.S.A. The total amount licensed was 31,520, so that here again there was a residue of some 5000 tons to arrive in 1944. This fertiliser, as is well known, has a high nitrogen content, considerably higher than that of ammonium sulphate. The Spanish Ministry of Agriculture (Dirección General de Agricultura) has approved various formulae for compounding mixed fertilisers based on ammonium nitrate, from which great benefits to Spanish agriculture are expected; and it is hoped that the steep upward curve in imports—presumably chiefly from the U.S.A.—will be maintained during 1944.

Imports licensed for calcium phosphate during 1943 amounted to 90,000 tons; actual arrivals during the year were 82,000 tons. This amount would yield about 180,000 tons of superphosphate; but the actual Spanish production of this latter during 1943 greatly exceeded this figure, amounting to 251,000 tons—according to the table of outputs by individual firms given by the author. In this the Unión Española de Explosivos heads the list with 82,600 tons, while S.A. Cros is a close second with 81,200 tons. The former company must have had large stocks in hand, for their share in the 1943 imports of calcium phosphate was only 13,572 tons as compared with 36,732 tons for S.A. Cros.

## Revised British Standard

### Analysis of Coal and Coke

**T**HE British Standards Institution has published a revision of B.S. 735 (Sampling and Analysis of Coal and Coke for performance and efficiency tests on industrial plant), originally issued in 1937, and in consequence the statement is no longer valid that the methods of analysis given in B.S. 1016 may be substituted for those in B.S. 735. In the latter publication full advantage has been taken of the further investigation work carried out in the course of the preparation of B.S. 1016. In the revision of B.S. 735 the method of determining the volatile matter has been modified in the light of experience gained since the issue of the 1937 specification. While the earlier method was found generally satisfactory with certain coals, the desired agreement was not obtained between different workers, and modifications now incorporated should improve matters in this respect. A further important change is the alteration in the design of the rotary sample divider. In the earlier issue the dividers for large and small samples were of different patterns. The design now used and recommended is the same for both sizes, and the one turntable can be used for the two purposes.

Copies of the revised specification are obtainable from the Institution, price 3s. post free.

## SAFETY FIRST

## Fire Prevention : Some Random Wisdom

by JOHN CREEVEY

THE display of posters about the works, strikingly pictured and aptly worded, has done a great deal to bring safety matters in close contact with the individual and to banish much carelessness, and in fire prevention such posters have done good service. But still there are outbreaks of fire which cannot be traced to anything but carelessness, for some of us are either unmindful of the advice which is proffered or else hold no serious regard for the losses which can be occasioned in both property and life by fire. To such persons particularly, as well as to all others who are reading these articles which have appeared monthly in THE CHEMICAL AGE, I appeal in the simple words found in a tiny book published by the Religious Tract Society at least 100 years ago, and which is possibly one of the earliest references emphasising need for precautions against outbreak of fire in the presence of inflammable material.

**"Advice to Shop Boys"**

I discovered this book on one of my visits to second-hand bookshops before the war; it was the title that prompted me to buy it, to preserve among such trifles as were relics of a bygone day, the title being *Useful Lads, or Friendly Advice to Shop Boys, Errand Boys, and others employed in Trade or Service*. The pages gave much good advice, which was none the less commendable for being presented in simple language, but not until the other day did my eye alight upon these words regarding fire: "Avoid carrying a lighted candle among shavings, or other things likely to catch fire. There may be certain articles of a dangerous kind connected with your master's business; for this reason, as well as a matter of obedience and fidelity, carefully observe any injunctions you may receive, whether or not you understand the particular danger against which they are directed. Many lamentable calamities have occurred in consequence of the disobedience and carelessness of servants in this respect. When a fire happens thus, the servant who occasions it may be fined a hundred pounds, or sent to prison for eighteen months' hard labour; and this cannot undo the mischief, or restore life."

Such is the advice which I now offer to all who are employed in industry, because the simplicity of these few words outweighs any others which might be written. And so it was, as regards the fine and imprison-

ment, for carelessness in causing a fire was a crime, and still remains a crime. By Act of Parliament passed in the 6th year of the reign of Queen Anne, if any "servant" (meaning employee) was proved to be the cause of outbreak of fire "by negligence or carelessness" he (or she) was by warrant from two Justices of the Peace to be made to "forfeit £100 (which was) to be paid to the Churchwardens of the Parish to be distributed to the sufferers by the fire," and in case of default or refusal to pay this fine the offender was "to be sent to the House of Correction, there to be kept at hard labour, at the discretion of the Justices, for this negligence." The law, as it stands to-day, has been somewhat modified, but the crime is still of equal seriousness to fellow-workers and to owners of property which may be involved.

**Parish Precautions**

This same Act of Parliament was one by which the Churchwardens of every parish within a certain boundary around London were required to "fix stop-blocks or fire-cocks on (water) mains and pipes, and to have and keep in repair a large (fire) engine, hand-engine, and leather-pipe and socket" as fire-fighting equipment, or otherwise be fined £10 for relief of the poor. Yet, to-day, there are works which still possess little or no means for dealing with a sudden outbreak of fire, apart from a stirrup pump and a bucket, which war contingencies have made essential. Even though a works may have one or two chemical fire extinguishers, it does not always follow that they are inspected at regular intervals to ensure they will function when the need arises. Those who have the management of such works should remember that fire is a menace to adjoining works as well as the one in which it may commence, and, in the words of Shakespeare (Henry VI, Part 3, Act IV, Scene 8),

"A little fire is quickly trodden out,  
Which being suffer'd, rivers cannot  
quench."

**Chemical Extinguishers**

Fire fighting by the use of chemicals, anticipating the use of the modern chemical extinguisher, can be traced back to 1792, when Nils Nyström, an apothecary, communicated to the Royal Society of Arts and Sciences at Stockholm, "A treatise on the

constituent principles of various simple and compound solutions for extinguishing fire," which was translated into English and here published (1793) in the form of "A Letter addressed to Sir John Sinclair, Bart., President of the Board of Agriculture and Improvements." Nyström's solutions were mixed with water in recommended proportions and were then to be expelled in a jet by aid of hand-operated fire-engines or pumps. The inventor had realised that water was not capable of extinguishing all outbreaks of fire, or at least that water was not always the most effective medium for quelling a fire; and this we have corroborated since by developing different chemical types of extinguisher, by the introduction of foam for fire-fighting, and by the discovery that certain chemicals exert a particular fire-quelling effect upon other chemicals, as in the case of using dichlorodifluoromethane for extinguishing methane flames (U.S. Bureau of Mines, *R.I.* 3042).

The simple solutions suggested by Nyström were of various kinds, such as 12 cans of the strongest solution of wood ashes mixed with 100 cans of water; 12 cans of crushed alum in 100 cans of water; 10 cans of common salt in 100 cans of water; or 20 cans

of sifted dry clay mixed with 100 cans of water. For one of his compound solutions he recommends the use of six cans of the strongest solution of wood ashes and six cans of sifted dry clay mixed with 100 cans of water. The use of dried and sifted clay in more than one instance is interesting, and there is little doubt that this clay actually retarded the progress of a fire by providing a fusible coating which was not only fire-resisting but actually sealed the surface of any porous combustible material on which it fell.

In agreement with the discovery implemented by Nyström, it is to be noted that water carrying a relatively high percentage of mud in suspension proves more effective than clean water in extinguishing a fire where the bulk of combustible matter is material such as timber or bales of sacking, into which the water can penetrate and leave a superficial layer of mud to clog the pores or interstices. Yet it is well to remember that a particular fire-pump may not operate satisfactorily with muddy water, and the resulting damage (in comparison with the use of clean water) may be serious from the point of view of salvaging unburned stocks.

## Preventing Fire Wastage

### Joint Responsibility

IT is not sufficiently known that fires not resulting from hostile attack are responsible for losses in industry comparable with those caused by the enemy, said Mr. G. E. Garrett, Deputy Director of Regional Organisation of M.A.P., addressing the London branch of the Institute of Civil Defence recently. Mr. Garrett stressed that it was essential for every employer and every worker to accept as his own personal and permanent responsibility the duty of avoiding some part of the continuous wastage of the country's resources due to fires. Dealing with elementary fire prevention measures which employers and employees in industry could take, he mentioned the necessity for tidiness—what is commonly called "good housekeeping."

Mr. Garrett's advice with regard to inflammable liquids was to clean up liquids spilled on to the floor or elsewhere; to arrange, in every case, a means of retaining within a limited area any serious spillage up to the total quantity present in the containers; to ensure complete understanding by all concerned of the nature of the vapours given off by inflammable liquids; to take care that all sources of ignition were always kept away from these liquids and to ensure that no greater quantity of inflammable liquids than was required for immediate needs was kept in the shops.

Perhaps the most universal and common cause of industrial fires was smoking. The ideal remedy was not the prohibition of smoking; proper receptacles for ends and matches should be provided and care taken to see that they were used. Where it was necessary by law to prohibit smoking, this was the responsibility of the employer, who should be certain that there was no smoking which contravened such laws or involved any obvious dangers.

## HEATING PLASTICS BY INDUCTION

The interest manufacturers of plastics are taking in electronic heating methods is evident in the granting of a patent (B.P. 560,101) to Du Pont de Nemours, for a process of inducing heat in thermoplastic organic materials that involves the incorporation of crystalline titanium dioxide (rutile or brookite) in the material which is then placed in an energised electrostatic field of radio frequency (e.g., 100,000 cycles-100 megacycles per sec.). Suitable thermoplastic organic materials include polyvinyl-acetal resins, polyvinyl esters of organic and inorganic acids, polystyrene, polyacrylates, polymethacrylates, and cellulose derivatives. The patent mentions applications of this method to the heating of adhesives in cementing operations.

## Dangers of Chrome

### Useful List of Medicaments

**A**VALUABLE article, entitled "Prevention and Treatment of Lesions caused by Chromates, Bichromates and Chromic Acid" and written by Dr. Albert R. Wilkerson, M.D., physician to the Mutual Chemical Co. of America, was recently published in the *Journal of the American Leather Chemists' Association* (1944, 39, 3, p. 90). It is of particular interest in view of the increasing use of hexavalent chromium chemicals in many important industries. Dr. Wilkerson stresses the danger of dust and chemicals left on the skin which may cause burns or sores. All injuries should be reported, no matter how slight, and first-aid treatment obtained for all cuts and abrasions, which must be kept well protected while at work. Where respirators are used they should be checked regularly once a week to see whether they are in good condition. Very few people are subject to chrome dermatitis if ordinary cleanliness is practised. The few individuals—perhaps 2 or 3 per 1000—who become severely affected, usually within a day or two, must be promptly removed from exposure to these chemicals.

### Medicine and Salves

The following simple preparations have proved very satisfactory:

**Nasal Ointment**, boric acid 60 grains, menthol 10 grains, petrolatum alba 480 grains. **Nasal Spray**, ephedrine-containing preparations, or 2 per cent. antiseptic dye. **Antiseptic Dye**, gentian violet, acrilavine or merucurochrome (2.5 per cent.). **Antiseptic Wash**, 1-1000 solution of bichloride of mercury for washing, 1-2000 solution of bichloride of mercury for wet dressing. **Eye Wash**, saturated solution of boric acid, or 3.5 per cent. solution borax, or 3.5 per cent. solution bicarbonate of soda. **Eye Drops**, castor oil; 5-15 per cent. solution of argyrol (freshly made, not over two weeks old). **Eye Ointment**, 1 per cent. mercuric oxide, yellow petrolatum base; any good analgesic ointment suitable for the eye. **Skin Ointment**, mix up 2 oz. lanolin, 1 oz. castor oil, 1 oz. zinc oxide and stir in 20 c.c. of 5 per cent. solution of wetting agent (such as aerosol). **Skin Salve**, zinc oxide-petroleum base; zinc oxide-lanolin base; zinc oxide-petroleum base, containing methyl salicylate; zinc oxide-petroleum base, containing phenol and oil of eucalyptus. **Accelerator**, thymol iodide powder. The original article should be consulted by those interested in further particulars of treatment.

Tincture of iodine should never be used on chrome ulcers.

## Newfoundland's Minerals

### Iron, Zinc, and Fluorspar

**N**EWFOUNDLAND'S minerals are making a small but far from negligible contribution to the war effort of the United Nations, and some interesting details about her mining industry in 1943 are provided in a report published in the Canadian *Commercial Intelligence Journal* (1944, 70, p. 451). The principal operations concern iron ore, zinc, and fluorspar. The Dominion Steel and Coal Corporation continued to operate the iron-ore deposit at Bell Island, the bulk of the shipments going to the company's furnaces and smelters at Sydney, Nova Scotia, but owing to shipping difficulties the firm operated on a part-time schedule most of the year. In addition to the iron-ore deposit at Bell Island, the corporation is working some high-grade magnetite and haematite deposits in the Indian Head area on the west coast near Aguathuna. The deposits are not large, and consequently there have been difficulties in achieving economic production. Further surveys in this area have uncovered other promising high-grade deposits. The corporation also operate a limestone quarry at Aguathuna, where production in 1943 was the greatest in the company's history. In addition to limestone, a considerable tonnage of dolomite has been shipped to Sydney, Nova Scotia.

### Leading War Industry

The Buchans Mining Company, at Buchans, is the largest single source of zinc for the United Kingdom, so that this enterprise has become Newfoundland's most important war industry. Operations at the Buchans plant were carried on this year with the greatest labour force in the company's history, although production per man was somewhat down as compared with previous years because of the inexperienced help employed. The production of lead, copper, and zinc concentrates was approximately equal to the high total reached in 1942.

In 1943, the fluorspar deposit at St. Lawrence produced a substantial volume of fluorspar for export to the Aluminium Company of Canada at Arvida, Quebec. Two separate organisations, one of which is controlled by the Aluminum Company, are in operation. Shipments in 1943 were about eight times greater than in 1941 and will make St. Lawrence one of the major industrial communities in Newfoundland. The deposits of fluorspar are substantial and, with the probable increased use of aluminum after the war, it is expected that this enterprise will continue to hold its present important place in the economic life of Newfoundland.

## Parliamentary Topics

### Lords' Debate on Employment Policy

NOTABLE contributions to last week's debate in the House of Lords on employment policy were made by Lord Trent and Lord McGowan. The debate had begun with a speech from the Minister of Reconstruction, Lord Woolton, who argued that a return to pre-war conditions might be disastrous, adding that he did not think it universally true that we wanted to get back to those conditions. He said the Government's proposals in the White Paper sought to secure a balanced distribution of industry, and he appealed to British industrialists to recognise that, in the interests of human justice and social stability, this employment problem had to be solved, and to join with the Government wholeheartedly in seeking and finding a solution. The proposals were not wild theories that no business man would look at; they were very practical ones. Some totalitarian States had gone a long way towards solving the problem, but at the price of freedom. We neither could, nor would, desire to do that here. The expense in the years between 1922 and 1939 of unemployment in manpower and money amounted to 1,700,000 people who drew unemployment benefits totalling £1,260,000,000—"an expense, both of man-power and money and misery, that we must not again incur."

#### Nearly Full Employment

Lord Trent took the view that "unless you have a totalitarian régime you cannot get full employment," but he thought a very high measure of steady employment was possible. He reminded the Labour Party that if they were going to nationalise industry they would have just the same interest in running things efficiently. But ruthless efficiency was a very dangerous thing. His own firm, if it had wanted to during the last 20 years, could probably have put all the chemists out of business, but it would not have been right and it would not have helped employment. "It is a thing you just do not do," he remarked. After referring to the unpopularity of State control—"I do not know if the people of London realise what a really tremendous hatred of control there is in the North and the Midlands"—he invited the Government to make a list of a minimum number of Controls, "the ones which we can all be more or less satisfied in our minds that we have got to have, and that we shall be able to persuade people to accept." He indicated that he supported the principle expressed in the White Paper that employment must seek in larger output rather than higher prices the reward of enterprise and good management.

Lord Trent concluded by urging the holding of a Government inquiry into combines and their agreements. He did not think these combines were nearly as bad as some people would make out, but he felt there was a great deal of suspicion about them in the public mind. Such an inquiry should not be held in public because it might do untold harm to some sections of the national trade and prevent some people from giving useful evidence, but the results and conclusions should be published.

#### Lord McGowan on Cartels

Lord McGowan took up the point about national and international agreements, saying that numerous and substantial benefits could flow from such collaboration. Many British manufacturers had ceased to believe in the inherent superiority of free or extreme competition and had moved successfully a long way in the direction of co-operation in industry and central action by the Government. The purpose of the agreements was to regulate, not to abolish, competition. He did not believe that the contention that cartels had the effect of restricting production and keeping up prices high was of general application, though isolated examples might exist. "On a dispassionate study of the facts, I submit that there are ample grounds for making use of the international cartel type of organisation in order to secure the benefits which it can undoubtedly bring. At the same time, steps must be taken to prevent the misuse of the powers which may be thus secured," he commented, adding that a Government investigation of the activities of combines, foreshadowed in the White Paper, would throw light where at present, through lack of knowledge, there was all too often only prejudice and hostility.

#### Overstressed Exports

Another point that emerged from the debate was made by the Earl of Huntingdon who thought that the matter of export trade was a red herring used to confuse the issue when discussing employment. He did not wish to belittle the importance of foreign trade which was, of course, vital to us, but he thought it was right to say that about 80 per cent. of our pre-war production went to supply the home market. "Some things we import because we can get them more cheaply than we could produce them in this country; for instance, certain foodstuffs. We also import some raw materials which we have not got and which we need for our industries, and some useful and luxury goods. Surely as long as we can import the absolutely necessary

materials for industry we are all right, and there is no real danger." Describing it as "undoubtedly the best feature of all" in the White Paper, this speaker welcomed the suggestion for establishing an economic staff to foresee economic trends and to advise on economic measures.

### Export Credit Facilities

Mr. Ellis Smith asked the President of the Board of Trade if he could make a statement on the consultation he had been having on credit facilities, upon which much of our post-war trade would depend. Mr. Dalton said that he hoped, following consultation with the Chancellor of the Exchequer, to be able to introduce legislation next session to extend export credit facilities.

### Trade with Russia

Mr. Ellis Smith also asked the same Minister whether he could now make a full statement on the consultations on post-war trade with the U.S.S.R.; who had taken part in the talks; and had any private firms been involved in any form. Mr. Dalton replied that these discussions were being carried on between H.M. Embassy in Moscow and the Soviet Government. The discussions were between Governments and no private firms were, therefore, involved in them. But a number of manufacturers in this country were, he was glad to say, in touch with Soviet representatives about post-war business.

### Patent Laws Committee

Mr. Parker asked the President of the Board of Trade whether the committee which was to consider the reform of the Patent Laws was empowered to investigate the records of patentees with a view to ascertaining whether the existing law has been used in a manner contrary to the public interest. Mr. Dalton said that an inquiry into this matter would certainly fall within the committee's terms of reference.

### Spanish Nitrate Plants

Spain's relations with Germany in matters of trade and technical development were the subject of several questions. Three M.P.s wanted to know whether tests of flying bombs had been made in Spain, and in addition Mr. Leach asked about the organisation of Spanish nitrogen factories by German engineers, and the continued export of iron ore, tin, and zinc. In his reply the Foreign Secretary said he understood that two nitrate factories were being constructed for which machinery was to be delivered from Germany, while German engineers were reported to be engaged in installation work at one of these. Neither factory had yet been completed and production would be to meet Spanish needs.

Iron ore and some zinc had been exported to Germany, but he had no information of any exports of tin. Zinc exports this year had decreased markedly on the 1943 figure.

Sir Percy Harris: Does the right hon. gentleman seriously suggest that the Germans are developing a nitrate factory in Spain for purely benevolent purposes?—Mr. Eden: My right hon. friend has misunderstood the position. I did not say that the Germans were developing a nitrate factory. I said they were delivering the machinery for it. Of course, there is trade between Germany and Spain. I think it is very likely that the development of these nitrate factories is due to the fact that it is very difficult for Spain to get nitrates from abroad.

### Bulk Purchase of Copper

Sir H. Williams asked the Minister of Production if he would publish the calculations on which the estimate was based that the bulk purchase of copper imports has resulted in a saving of £40,000,000 during the whole course of the war. The Minister of Production said it would not be in the public interest to give details. It was estimated, however, that the difference in the average price paid during the war to producers in the U.S.A. and South America for refined copper f.o.b. refinery and that paid for refined copper f.o.b. under the long-term contracts entered into by H.M. Government early in the war amounted in the aggregate, in respect of our purchases during the five years of war, to approximately £35,000,000. That sum by no means covered all the savings which have been made by bulk purchase of copper.

### Scottish Steel

Mr. Thomas Fraser asked the Minister of Supply to what extent the total or partial closure of steel-making plant had lessened production of steel in Scotland during the past six months. Sir Andrew Duncan said it would not be in the public interest to publish particulars of steel output, but production in Scotland had followed the same trend as in Great Britain as a whole.

Mr. Fraser also drew attention to the lack of facilities in Scotland for making certain kinds of light steel sheeting. He was particularly concerned at the fact that steel sheeting used in the construction of prefabricated houses was not rolled in Scottish mills. The Minister of Supply, Sir Andrew Duncan, said that all practicable steps were being taken to relate the production of steel sheets geographically to consumption in order to save transport and labour. Certain qualities of sheets required by light engineering firms in Scotland had to be imported, as there was no plant to make them in that country.

## Chance Memorial Lecture

### Coal for Power

**M**R. KENNETH M. CHANCE, chairman and managing director of British Industrial Plastics, Ltd., speaking at the first of the Chance Memorial Lectures of the S.C.I. at the Grand Hotel, Birmingham, on June 28, with Dr. Cullen in the chair, advocated the utilisation of coal to provide the country's organic chemical industry with its fundamental requirements (including power) from native resources at prices which would enable the country to take the lead in the manufacture of new products. The lectures commemorate the association of the Chance family with the glass, plastics, and chemical industries in the Midlands for the past 100 years.

### Wasteful Neglect

Mr. Chance maintained that our first duty was to make the most of the sources of power available, and the first source of power in this country was coal. We had so neglected these invaluable native resources that although we had coal and limestone lying side by side, we shipped the coal to Norway to bring it back in the form of carbide or cyanamide. We took coal from our richest seams to burn in our grates and under boilers and then abandoned the rest because it could not be mined any longer at a profit. Meantime the methane, the ethylene, the benzol, the phenols, and all the other combinations that could be drawn from coal tar, had either gone back into the atmosphere in smoke, or were left abandoned in the ground. He was no engineer, he admitted, but he had been told by one who was that there were plenty of abandoned workings in this country where ample coal remained for gasification underground. There were certainly unworked seams on which a trial could be made. The Russians had tried to gasify coal underground, and it ill became those who had failed to make any such attempt in this country—the very life-blood of whose industry was coal—to criticise those who had had the courage to carry through practical trials on a great scale.

In other countries power was derived from falling water. Where such falling water was fed by natural lakes and the fall was provided by nature and was considerable, electricity could be generated very economically. Such conditions did not exist in this island. Yet up to £30,000,000 was to be guaranteed by the Government in the endeavour to create such conditions in Northern Scotland. For what purpose? asked Mr. Chance. If to provide light and heat to towns and villages, the cost seemed excessive. If to create power for industries, where were the raw materials for

such industries to come from? Surely it would be better to spend a fraction of that large sum in an endeavour to obtain a cheap source of power by gasifying coal underground in districts where everything was available for converting the power to the benefits of mankind in raw materials, labour, housing, and transport facilities.

### Cheap Power Essential

Before the war the voices of finance and commerce dinned into everyone that all was well, that our invisible exports made up for the lack of material exports. Our ships lay idle, our furnaces were blown out, our skilled workmen sought in vain for outlets for their skill and our markets were flooded with foreign goods that we could have made perfectly well for ourselves. Nothing could be well with a country whose industry was not founded upon the rock of cheap power. We must get down to fundamentals, secure our home market, not by tariffs, but by providing it with what it needed more cheaply and better than others could do it for us, and exports would follow.

## WELDING ALUMINIUM BRONZES

The difficulties involved in welding aluminium bronzes are well known, and it is partly on this account that so valuable a type of alloy has had only a limited application. These difficulties arise mainly from the formation of tenacious films of aluminium oxide when the metal is welded by the acetylene process, or indeed when it is cast in the foundry, unless special casting technique is developed. Such a technique has been in operation for some time, but it is only recently that the welding of these alloys has met with any degree of success.

A leaflet just issued by Murex Welding Processes, Ltd., Waltham Cross, explains how, by the use of a specially compounded coating, their "Bronalex" electrode enables bronze material to be welded as easily as steel. This electrode deposits metal containing approximately 10 per cent. aluminium, 4 per cent. iron, and 4 per cent. nickel, and is well suited to repairing, fabricating, and salvaging complex high tensile aluminium bronzes. The strength of the weld metal is of the order of 37.41 tons sq. in., and the crystal size is much finer than that existing in castings. For welding tin bronzes and brasses, "Bronze 6" electrode is recommended. The leaflet mentioned describes the technique to be employed; and it is specially noted that only direct current can be utilised with "Bronalex" electrodes. The electrodes should be connected to the positive terminal.

## A CHEMIST'S BOOKSHELF

## Adsorption of Gases and Vapours

Dr. Brunauer's Important New Work\*

**I**N this first volume of his work on adsorption, Dr. Brunauer deals almost exclusively with physical adsorption, leaving the other aspect—chemical adsorption—for a projected second volume. He stresses that the essential difference between the two aspects of the process is that while physical adsorption consists of surface condensation, chemical adsorption implies surface reactions. He emphasises that he chose the rigidly scientific treatment of the subject, focussing attention on a discussion of the phenomena of adsorption, in preference to the accumulation of empirical data on the adsorptive properties and behaviour of the important commercial adsorbents. The method adopted, undoubtedly the more difficult approach to the problem, is handled with great skill, the extensive volume of data being collated and correlated into a scientific picture of the process so far as the known facts permit. Dr. Brunauer, however, would be the first to admit that in spite of the voluminous data available, so admirably summarised and marshalled, there are wide gaps in the fundamental knowledge of the process.

Commercial applications of the phenomenon of physical adsorption are exceedingly important, comprising the purification and separation of gases (e.g., in gas-masks), the purification of hydrogen before catalytic hydrogenation, the extraction of petroleum from natural gas, and the recovery of benzine and light oils from illuminating gas. In all the vital processes involving heterogeneous catalysis, adsorption constitutes probably the dominant factor. In view of these facts this volume will prove of great value to the student and teacher no less than to the practical chemical engineer, although he will not find in it an equation enabling him to calculate the height of an adsorption tower or the required rate of flow of gases over an activated catalyst.

Detailed criticism of the volume is not required, but an indication may be given of the scope of the work and of the discussion of the different aspects of the problem. In Part I, comprising the definition of terms, the data of adsorption, and a critical analysis of the various experimental methods, the author emphasises the great similarity between the behaviour of the adsorbent and that of a non-ideal gas or liquid. This postulate recurs time and again and is un-

mistakably substantiated by a great wealth of evidence. When considering the adsorption isotherm, the largest section of the book, Dr. Brunauer reviews the various theories and formulae in existence.

## Theories Reviewed

Outstanding in the earlier work is Langmuir's theory founded on the belief that chemical forces are the basis of all adsorption. The formulation of the adsorption equation does not, however, include the law of forces and is therefore applicable to purely physical adsorption (or "van der Waal's adsorption" to use the term commonly employed by Dr. Brunauer). While Langmuir's equation frequently fits the data for unimolecular adsorption on a homogeneous surface, it fails when the adsorption surface is heterogeneous with consequent wide variations in the heats of adsorption.

The Potential theory of Polanyi and the Capillary Condensation theory both postulate the existence of multimolecular layers. According to the Potential theory the adsorbent exerts a strongly attractive force on the gas in the vicinity, the forces being sufficiently strong to build up a succession of molecular layers existing in a state of great compression. Eminently successful in accounting for the temperature dependence of physical adsorption, the theory is the only one capable of handling quantitatively adsorption on a strongly heterogeneous surface. No adsorption isotherm has been formulated and the scope of information available according to the theory is limited.

The Capillary Condensation theory put forward by Zsigmondy cannot account for adsorption at low pressures, but at higher pressures plays an important part for all adsorbents except those with exceedingly fine pores. An outstanding feature is that all reasonable explanations of hysteresis in the adsorption isotherm are based on capillary condensation.

In 1929, de Boer and Zwicker formulated the Polarisation theory explaining that multimolecular adsorption of non-polar molecules on ionic adsorbents is due to induced dipoles. The topmost layer of adsorbent induces dipoles in the first layer of adsorbed molecules, each successive layer of molecules inducing dipoles in the superincumbent layer. Dr. Brunauer shows, however, that the binding energy that may be attributed to polarisation is negligibly small even in the second layer of molecules.

The author and his collaborators in re-

\* ADSORPTION OF GASES AND VAPOURS: Vol. I, PHYSICAL ADSORPTION. By Dr. S. Brunauer, pp. 511. Princeton University Press (\$7.50) and Oxford University Press (37s. 6d.)

search work distinguish five different types of adsorption isotherms and propound the multimolecular adsorption theory, claiming that this is the first formulation of a unified theory of physical adsorption. Based on the assumption that the forces active in producing condensation are also mainly responsible for the binding energy of multimolecular adsorption, the theory fits the entire course of adsorption isotherms and supplies an equation capable of describing all five types of isotherm. Functioning best in the middle adsorption region (preceding and following the building up of a unimolecular layer) the theory proves less satisfactory at low pressures, where it is open to the criticism applied to Langmuir's equation, while at high adsorptions the theory leads to incomplete filling for the larger sized capillaries. In general, however, the theory does appear to mark an advance toward a more complete understanding of the various phenomena.

Proceeding to discuss the heat of adsorption, the author shows the close parallelism between heat of adsorption and heat of compression, the adsorbed phase existing under great compression. As the net heats of adsorption of a given gas on different adsorbents are approximately equal, it appears that the factor of decisive importance is not the nature of the adsorbent but the extent of the surface area.

#### Surface Characteristics

Following upon a careful analysis of the various methods for determining total surface area, Dr. Brunauer draws the important deduction that the surface of adsorbents may be divided into two parts: a heterogeneous part possessing higher heats of adsorption and consequently much greater activity; and a homogeneous part with smaller but approximately constant heat adsorption. The activity of the adsorbent seems to be directly related to these heterogeneous areas. Heterogeneity of the surface may be due to narrow cracks and crevices, the presence of adsorbed impurities, or the different atomic arrangements on the different lattice planes of a crystal. The heterogeneity of the surface may be altered by various methods; those increasing the heterogeneity are said to "activate" the adsorbent. Chemical action normally constitutes the best method of activation; for example, the surface area of a magnetic adsorbent may be increased 100 times by alternate oxidation and reduction, while the adsorptive power of the mineral chabazite ( $\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot 4\text{SiO}_2 \cdot 6\text{H}_2\text{O}$ ) may be increased from zero to equal that of charcoal by merely dehydrating.

The pore structure of the adsorbent plays a vital rôle in multimolecular adsorption, Dr. Brunauer showing that both the multimolecular adsorption and capillary

condensation theories agree that the narrower pores fill up at lower relative pressures and the wider pores at higher pressures. At saturation pressure the entire pore structure is filled with a liquid like adsorbate. Evidence is produced to show that the structure curve and pore size may be determined from the adsorption isotherm. Alterations in the pore structure leading to an increase or decrease of activity may be induced by heat or by chemical action. Reversible volume changes are always associated with adsorption, while in some instances the volume changes are directly related to the lattice arrangement of the atoms of the adsorbent. Hysteresis in the adsorption isotherm is also connected with the pore structure, the capillary condensation theory suggesting that hysteresis may arise from incomplete wetting of the pore walls due to previously adsorbed impurities.

#### Adsorption Kinetics

A short section is devoted to the kinetics of physical adsorption. In many cases adsorption occurs so rapidly that equilibrium studies alone are important, but in 1937 Taylor pointed out that some adsorption processes occurring at higher temperatures do take a finite time to complete. The pore diameter appears to play an important part in determining the speed of adsorption.

Most of the technical applications of adsorption processes involve gas mixtures, study of mixed adsorption becoming of considerable importance. In a mixture of two gases one may cause an appreciably greater adsorption of the other than is experienced with the pure gas alone, e.g., mixtures of CO and  $\text{CO}_2$ . A similar effect is the selective adsorption of benzene from a mixture of benzene and carbon tetrachloride. The adsorptive power of a substance may be increased by the addition of certain chemicals—normally in the colloidal state—adsorbents with those heightened powers being said to be "promoted."

Such, in very brief outline, is the general argument of this valuable volume. Of the abiding worth of the book there cannot be the slightest doubt, and Dr. Brunauer has surely earned the thanks of all interested in this very important but hitherto largely empirical branch of science.

**PLASTIC MOULDING.** By D. A. Dearle. London: Hutchinson. Pp. 104. 6s.

This book is described on the dust-cover as being "directed primarily to the commercial plastic moulder, who will find it replete with helpful techniques." It is written by the manager of an American plastic-moulding plant, but we feel he has little to tell our plastics industry that it does not already know.

## Personal Notes

DR. WILLIAM CULLEN has been elected an honorary member of the Society of Chemical Industry.

DR. GUSTAV EGLOFF has been accorded the unusual honour of being re-elected president of the American Institute of Chemists for a further two-year period.

SIR HOWARD FLOREY is to visit Australia, where he will stay for three months. He was invited by the Australian Prime Minister.

MR. L. E. WESTMAN, of Toronto, associate director of National Selective Service, was elected president of the Canadian Institute of Chemistry at the annual general meeting last month.

DR. P. O. STELLING has been appointed Professor of Chemical Technology at Stockholm Technical College. He was previously chief chemist with the Reymersholm company at Helsingborg.

SIR ROBERT ROBINSON, F.R.S., has left this country by air for Trinidad, where he will be staying for two months in connection with activities of the Colonial Products Research Council.

PROFESSOR H. RAISTRICK, F.R.S., Professor of Biochemistry at the London School of Hygiene and Tropical Medicine, has been appointed honorary scientific adviser on penicillin production by the Minister of Supply.

MR. H. W. CLARK, M.Inst.C.E., an assistant engineer in the department of the chief engineer (civil) of London Transport, has been awarded the Sir William J. Larke Medal for 1944, and a prize of £50, by the council of the Institute of Welding, for his paper "Some Applications of Arc Welding, embodying Specific Details of Welded Work."

MR. H. W. ROWELL has been nominated as the representative of the Society of Chemical Industry on the Committee on Patents set up by the A.B.C.M.; and he is also serving, along with DR. T. H. DURRANS, MR. C. S. GARLAND, MR. T. W. JONES, DR. R. LESSING, and the honorary officers, on the S.C.I.'s own committee which has been appointed to consider views to be put before the Board of Trade Patents Committee.

DR. L. M. PIDGEON, head of the department of metallurgical engineering at the University of Toronto, has been awarded the McCharles Prize by the university board of governors in recognition of his development of a process for practical production of magnesium from Canadian dolomite. Dr. Pidgeon has already won a Professional Institute Medal for 1943 for his process, which has made Canada self-sufficient in magnesium.

DR. C. J. SMITHILLS has been appointed director of research to the British Aluminium Co., Ltd.

MR. A. J. F. MACDONALD, director and secretary of the War-time Paint Manufacturers' Association and secretary of the Paint Industry Export Group, has been adopted by the Roxburgh and Selkirk Liberal Council as their prospective parliamentary candidate.

Two Leeds University professors, DR. F. M. ROWE, Professor of Colour Chemistry and Dyeing, and DR. J. B. SPEAKMAN, Professor of Textile Chemistry, became freemen of the Worshipful Company of Clothworkers at a ceremony in London on July 5.

## Aluminium Alloys in Building

### A Medium for Prefabrication

ARCHITECTS and others connected with building are showing an increasing interest in the potentialities of aluminium alloys, and this was further stimulated by a lecture recently given to the Incorporated Association of Architects & Surveyors by DR. E. G. West, manager of the Wrought Light Alloys Development Association, and Mr. D. V. Pike. In an earlier paper (*Light Metals*, Jan., 1944), Dr. West described some of the possible uses of aluminium alloys for building, referring in particular to the scope afforded by prefabrication. In the present lecture some of the more definite trends in the structural and other uses of these materials were indicated. Aluminium alloys should make a substantial contribution to the solving of the great national problem of post-war housing, for it seems that the programme envisaged will be large enough to absorb all the traditional materials available plus any new ones that can be usefully added.

Properties of these alloys, such as low weight (about one-third that of steel), high resistance to corrosion, great strength, and pleasing appearance, have appealed to many authorities as being particularly valuable in the production of the prefabricated units that are destined to play an important part in the speedy and economical erection of houses. The various systems using metals as the basis of construction are very numerous, and there is little or no technical reason why aluminium alloys, of which a wide range is now available, should not be used in all of them with very little change. All aluminium alloys for aircraft purposes are covered by specifications, and British Standards suitable for building and general engineering purposes will be available shortly. This lecture will be published in the August issue of the *Parthenon*.

## General News

The Treasury has made an Order renewing until June 30, 1945, the exemption from Key Industry Duty of all articles already exempt (S.R. & O. 1944, No. 698).

In the first six months of this year the Red Cross and St. John packed and despatched nearly 3½ million parcels of food and comforts to British prisoners in Europe.

It is announced, in the July *Quarterly Bulletin* of the Institution of Chemical Engineers, that since the last issue fourteen new members and eight new associate members have been elected to the Institution.

The kerosene (paraffin oil) priority scheme will continue for a further twelve months, ending July 31, 1945. Registered consumers need not make fresh applications for priority.

The safe operation of abrasive wheels is discussed in an article published in the December, 1943, issue of the Industrial Accident Prevention Bulletin of the Ministry of Labour and National Service.

Newcastle-on-Tyne, followed closely by Derby and Huddersfield, has raised the highest amount per head of population among the big towns of England and Wales, for the Red Cross Penny-a-Week Fund. Newcastle's quota was 114.8 pence per head.

The Nitrogenous Fertilisers Order, 1943, made by the Minister of Agriculture and the Secretary of State for Scotland, is revoked by the Nitrogenous Fertilisers (Revocation) Order, 1944 (S.R. & O. 1944, No. 737).

A new East of Scotland branch of the Institute of Welding has been formed by 34 members attending a meeting held in the Heriot-Watt College, Edinburgh. The provisional committee includes Mr. Llewellyn as chairman and Mr. W. Basil Scott as hon. secretary.

A picturesque incident occurred at the last Council meeting of the Society of Chemical Industry, when a gavel made by the president, Dr. Wallace Cohoe, from the wood of a persimmon tree growing at Priestley's American home was passed round the table. The chairman said that he had been asked to present the gavel to the Royal Society.

The Potash Fertiliser (Rates of Application) Order (S.R. & O. 1944, No. 740), dated June 30, provides that no potassium salts shall be applied to any crop not specified in the schedule attached to the Order, nor at a rate in excess of that specified in the schedule, except under a special authority issued by a County War Agricultural Committee.

## From Week to Week

Dust-collecting machinery finds many uses in the chemical industry where materials in powdered or fibrous form are handled, and readers will find the booklet *Modern Dust Collection*, published by the Visco Engineering Co., Ltd., Stafford Road, Croydon, full of helpful suggestions and details about this branch of technology.

The use of a material obtained by chlorinating solid polyethenes as "dope" for aeroplane fabrics is described in British Patent 560,168, registered in the names of J. R. Myles, F. J. Siddle, D. Whittaker and I.C.I., Ltd. The chlorination is carried out at a temperature generally below 60° C. until the chlorine content reaches 60-70 per cent. by weight.

A register of safety officers is being compiled by the Royal Society for the Prevention of Accidents, 52 Grosvenor Gardens, London, S.W.1. Its purposes are to provide a mailing list in connection with the inauguration of a special Safety Officers' Section of ROSPA, for compiling essential data for use in a campaign to encourage the employment of more safety officers in industry, and as a live register for changes in employment.

No question of compensation arises out of the stoppage by Portugal and Spain of wolfram exports to Germany. This was the gist of an answer given by the Parliamentary Secretary to the Ministry of Economic Warfare to Mr. A. Edwards last week. He said, however, that discussions were proceeding to explore the possibility of increasing trade between those two countries on the one hand, and the British Empire and the United States on the other.

A joint meeting of the Association for Scientific Photography and the Scientific Film Association was held at the Ministry of Information on June 24, to discuss "The Construction and Presentation of Scientific Films." Mr. Arthur Elton, president of the Scientific Film Association, opened the meeting by introducing the work of the two Associations. The Scientific Film Association, he said, was actively engaged in spreading the use of the film for the dissemination of general knowledge of scientific methods and achievements, and also for training purposes. The Association for Scientific Photography, on the other hand, was concerned with the uses of photography and cinematography for scientific research purposes. Mr. Geoffrey Bell spoke on "Shooting a Scientific Film," and Dr. J. Yule Bogue, president of the Association for Scientific Photography, dealt with "The Production of Scientific Films for Biological and Medical Purposes."

**The Wrought Light Alloys** Development Association has taken additional accommodation adjacent to the present offices at Union Chambers, 63 Temple Row, Birmingham, 2. The address remains the same, but the telephone number is now MIDland 0847.

**Industrial development** of the Machrihanish district of Kintyre, Argyllshire, is foreshadowed by the reported negotiations for the reopening of the coalfield there. It is stated that boring has disclosed extensive seams both inland and under the sea. Deposits of high-quality sand, suitable for glass-making, and of clay for brick-making have already been located in the area.

### Foreign News

**Guayule rubber** was harvested in Mexico to the amount of 8000 tons last year, as against 6000 tons in 1940. This material is being used in the United States for mixing with synthetic rubber.

**A method for determining** the alkali solubility of cellulose, according to Billerud, controlled by the Analysis Committee of the Swedish Central Laboratory of the Cellulose Industry, is included in *Svensk Papperstidning* for April 30 (with English translation, p. 193).

**A factory for processing** babassu nuts is to be set up shortly about 60 miles from the capital of the State of Maranhão, according to the Brazilian Ministry of Agriculture. Hitherto the bulk of the State's babassu nut production has been exported in kernel to the United States.

**Fabrics coated** with polyvinyl acetal resin are finding an increasing number of uses in American army equipment. Articles as diverse as jungle hammocks, Arctic sleeping-bags, and emergency sails for life-rafts, utilising this method of proofing, have been exhibited in New York by the Fabrikoid division of Du Pont de Nemours.

**The Union Government** has recommended to the Director-General of Supplies, South Africa, that a higher priority be given to the importation of phosphorus rat poison, as this is one of the many chemicals that cannot be manufactured in South Africa, in some degree because of lack of the necessary raw materials.

**Opening the 100-octane petrol plant** of the Republic Oil Refining Company at Texas City on June 15, Mr. R. K. Davies, U.S. Deputy Petroleum Administrator, remarked that American capacity for producing 100-octane fuel had risen from 40,000 barrels to about 400,000 barrels in 30 months. Complimenting petroleum chemists on their ingenuity, he cited a torpedo grease that would not come off in water, and aviation lubricants that were equally effective in tropical heat and at stratosphere temperature, among recently developed special products.

**The air offensive** against enemy oil proceeds with unabated vigour. Last week-end oil-refineries were attacked at Ploesti, Rumania, at Brod, Yugoslavia, and at Floridsdorf and elsewhere, near Vienna. At the same time, Mosquitoes bombed a synthetic oil plant in the Ruhr.

**The Association of Consulting Chemists** and Chemical Engineers, Inc., New York, announces, on its 15th birthday, the accession of 24 new members. These include Dr. Marston T. Bogert, an honorary member of the S.C.I., and Mr. G. Ullman, of Salford, England.

**A project** to increase U.S. production of carbon black is being considered which would involve the construction of a 60-mile pipeline to carry natural gas to factories now working below capacity in the Panhandle area of Texas. The proposed pipe-line would furnish some 60,000,000 cu. ft. of gas a day, which would go a long way towards meeting the annual requirements of an extra 100,000,000 lb. of channel carbon black.

**Argentine imports** of caustic soda and sodium carbonate last year amounted to 127,700 short tons, as against some 46,000 and 61,000 in 1941 and 1942 respectively. Imports of other chemicals dropped from 153,121 short tons in 1941 and 124,984 in 1942 to 93,500. It is significant that between the years 1937 and 1943 the number of workers engaged in Argentina's chemical, drug and paint industries rose considerably—from 16,700 to 23,848.

**Published figures show that U.S. exports** of chemical products to Latin America increased from \$28,000,000 in 1936 to \$85,000,000 in 1941, after which year they were affected by the entry of the U.S. into the war. In 1942 the U.S. exported \$18,150,000 worth of such products to Mexico and \$10,900,000 worth to Brazil. Shipments of caustic soda and soda-ash represented over two-fifths of the total value of U.S. chemical exports to Latin America in 1941 and 1942.

### Forthcoming Events

The adjourned portion of the annual general meeting of the **Society of Chemical Industry**—the luncheon and afternoon proceedings—will be held at a date to be notified later.

A summer school in X-ray Crystallography will be held in Cambridge on **September 4-16**, on the lines of last year's school. Professor Sir Lawrence Bragg and Professor C. E. Tilley have kindly granted the use of the Cavendish Laboratory and the Laboratory of the Department of Mineralogy and Petrology. The teaching will be carried out by Dr. N. F. M. Henry, Dr. H. Lipson,

Miss A. M. B. Parker, Dr. D. P. Riley, and Dr. W. A. Wooster. Those wishing to attend should apply at once for an entry form and prospectus to Mr. G. F. Hickson, Stuart House, Cambridge; entry forms must be returned by **July 24** at latest.

The **Institution of Chemical Engineers** is holding a joint conference with the **Institute of Physics** and the **Chemical Engineering Group** at the Royal Institution on **September 22 and 23**. The subject is "Instruments for the Automatic Controlling and Recording of Chemical and other Processes." Further particulars will be obtainable next month from the Organising Secretary Joint Conference, Institution of Chemical Engineers, 56 Victoria Street, London, S.W.1.

## Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

### Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an \*—followed by the date of the Summary, but such total may have been reduced.)

**BRITISH ALUMINIUM CO., LTD.**, London, E.C. (M., 15/7/44.) June 23. disposition by Chas. I. Reid and another with consent of the company granted in implementation of a Trust Deed dated September 12, 1934: charged on Ardul, Grange Road, Burntisland, and fixtures. \*£3,270,644. April 14, 1944.

**W. & J. GEORGE, LTD.**, Birmingham, chemical and physical apparatus manufacturers. (M., 15/7/44.) June 22, £3000 mortgage, to Mrs. R. H. Gilley, Torquay, and another; charged on 99, 101 and 103 Clifton Road, Balsall Heath. \*Nil. February 8, 1944.

## Company News

**United Premier Oil and Cake Co., Ltd.**, announces a final dividend of 8½ per cent., making 15 per cent. (13½ per cent.) for 1943.

**The Midland Bank, Ltd.**, announces a net interim dividend, for the half-year ended June 30, of 8 per cent. (same).

Net profit of **British Glues and Chemicals, Ltd.**, for the year ended April 30, was £98,702 (£97,756). The unchanged dividends were reported a fortnight ago.

**Fricker's Metal and Chemical Co., Ltd.**, have recorded a net profit of £5431 (£3511) for the year 1943. The 4 per cent. ordinary dividend has already been reported.

**Egyptian Chemical and Drug Industries Ltd.**, have increased their nominal capital beyond the registered capital of £25,000 by the addition of £15,000 in £1 ordinary shares.

**British Plaster Board, Ltd.**, have declared a final dividend of 15 per cent., making 25 per cent. for the year ended March 31 (same). Net profit is £161,028 (£250,633).

**The Yorkshire Dyeware and Chemical Co., Ltd.**, are paying a final dividend of 10 per cent., making 15 per cent. (same) for the year ended March 31. Net profit was £42,477 (£43,415).

**Birmid Industries, Ltd.**, report a net profit for the year ended October 31, of £120,354 (£118,920), and are repeating both the 10 per cent. dividend and the 7½ per cent. bonus.

**The Morgan Crucible Co., Ltd.**, reports a trading profit, for the year to March 31, of £794,219 (£775,652), and is paying a final ordinary dividend of 6½ per cent., making 10 per cent. (same), plus a bonus of 2½ per cent. (nil).

## Chemical and Allied Stocks and Shares

**A**LTHOUGH less active in most sections, stock markets have maintained a firm undertone, with British Funds again showing an upward tendency, and leading industrials fully maintaining recent gains. Sentiment reflected the war news and also hopeful views as to the scope for better dividends after the war. Consequently, many shares continued in demand despite the moderate yields on the basis of current dividends.

Lever & Unilever provided a good feature with an advance to 42s. on expectations that after the war there will be good prospects that the dividend may return to the pre-war level of 10 per cent. In respect of the current year, however, it is generally assumed that the payment will again be limited to 5 per cent., bearing in mind that the position of the dividend equalisation agreement in respect of the Dutch Lever N.V. is unlikely to be finally settled until after the war. Imperial Chemical were more active around 40s. 3d., buyers being attracted by the favourable yield shown on the basis of the 8 per cent. dividend. B. Laporte held their improvement to 83s. 9d., while Borax Consolidated deferred further improved to 38s. 9d. British Match at 41s. 3d. and British Aluminium at 49s. 3d. were also higher on balance, while, pending the dividend announcement, the shares of the Metal Box Company further improved to 92s. 6d. Yield considerations continued to bring in buyers for United Molasses, which rose further to 38s., while the units of the Distillers Co. were 99s. British

**"POSTLIP"**  
(No. 635 Mill)  
**ENGLISH  
FILTER  
PAPERS**

White and  
Grey, Plain,  
Antique,  
Crinkled,  
and  
Embossed.



**Pure Filterings for  
Laboratory Work,  
and in quantities  
for all Industrial  
purposes.**

*Postlip Filterings are stocked by all the leading Wholesale  
Laboratory Dealers*

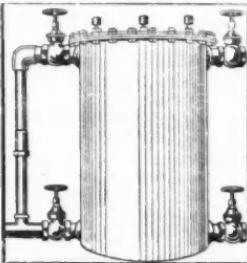
**EVANS ADLARD & Co., Ltd.**  
POSTLIP MILLS  
WINCHCOMBE, CHELTENHAM, ENGLAND

All sizes,  
Squares,  
Circles and  
Folded Filter  
Rolls made  
to order

See report of TESTS  
made by the National  
Physical Laboratory, a  
copy of which will be  
sent on application  
together with free  
samples if required.

**TO  
LARGE USERS  
OF WATER**

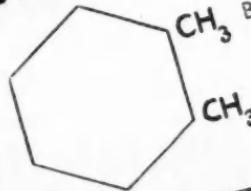
Berkefeld LARGE SUPPLY Filters are reliable . . .  
endurable . . . simple to operate. In pattern T the  
impurities, trapped by the cylinders, can be cleaned  
away in a few minutes—without having to open or take  
the filters apart. Just imagine how this can be of service  
to you with all  
to-day's labour  
difficulties. And,  
furthermore,  
these filters guar-  
antee a constant  
supply, with an  
hourly output of  
250 gallons to 550  
gallons according  
to the size of the  
filter.  
For full informa-  
tion on sizes,  
capacities and  
prices, write to



**BERKEFELD FILTERS**

BERKEFELD FILTERS LTD. (Dept. 61), SARDINIA HOUSE,  
KINGSWAY, LONDON.

**ORTHO-XYLENE**



B.Pt. @ 760 mm. 144.5°C

Sp.Gr. @ 15.5°C - 883

Small quantities available for  
research purposes

**YORKSHIRE TAR DISTILLERS LTD  
CLECKHEATON, YORKS.**

TEL. CLECKHEATON  
790 (5 LINES)



TELEGRAMS TO-  
YOTAR CLECKHEATON

Plaster Board were 34s. 10½d. "ex" the dividend.

Firmness at 85s. 3d. was shown in Turner & Newall, and Wall Paper Manufacturers deferred were 44s. 6d. British Oxygen have strengthened to 83s. 3d. and, in other directions, Birmid Industries rose to 85s. on the results. Triplex Glass 10s. ordinary were 41s. 4½d., partly on the possibility of a higher dividend for the financial year ended last month, but mainly on hopeful market views as to the scope for recovery in post-war profits and dividend payments. Associated Cement were firm at 68s., and British Portland Cement advanced further to 105s., while Tunnel Cement were higher at 56s. 6d. Boots Drug remained active, and at 53s. 9d. showed a further advance, although best prices touched in the past few days were not fully held. The market is assuming that the dividend would not have been increased to 30 per cent, unless there were considered to be good prospects of its maintenance, while the disposition is to budget for higher payments after the war. Sangars were 26s. 7½d., Timothy Whites 35s. 10½d., and Beechams deferred 18s. 3d.

In iron and steel, the Guest Keen results were favourably received and the shares were 39s. 9d. x.d. Stewarts & Lloyds were favoured and moved up to 57s. 6d., while Tube Investments rose to 99s. 6d. United Steel were firm at 27s., Dorman Long at 28s., and Colvilles at 25s. 6d. Consett Iron 6s. 8d. ordinary were steady at 9s. 3d. on satisfaction with the profit figures and dividend. Staveley ordinary improved to 54s. 6d., Neepsend to 33s., and Babcock & Wilcox rose to 53s. 9d. Pressed Steel were better at 32s. Textiles were not as active, but quite well maintained, with Bradford Dyers 24s. 3d., Bleachers 11s., and Calico Printers 17s. British Celanese have been active around 32s., and Courtaulds around 5s. 9d. In other directions, General Electric have improved to 97s. 6d. pending the dividend announcement. Barry & Staines kept firm at 49s. 9d. on the dividend, and Michael Nairn were 78s. 9d. General Refractories 10s. shares held their recent rise to 18s. 6d. De La Rue were 185s., Erinoid 10s. ordinary were 11s., and British Industrial Plastics 2s. shares 7s. 6d. British Drug Houses kept at 26s. 9d., while Burt Boulton were 24s., and Cellon 5s. shares 24s. 6d. Oil shares have been well maintained; "Shell" were 84s. 4½d.

## British Chemical Prices

### Market Reports

CONTINUED active trade is reported this week in virtually all sections of the London industrial chemical market, the demand for heavy chemicals for the textile and dyeing industries being the chief

feature. A fair amount of fresh inquiry is in evidence although in some directions actual quantities on offer are restricted by the limited supplies available for other priority needs. An active market exists for the majority of the soda compounds and the hyposulphites of soda are in good demand, while offers of chlorate of soda are quickly taken up. A brisk inquiry is reported for Glauber salt and salt cake, while a fair business is being done in acetate of soda. Strong markets and limited supplies are the chief features of the potash section, with yellow prussiate of potash nominal and caustic and carbonate of potash in good call. Acid phosphate of potash is very firm and a steady demand is reported. In other directions formaldehyde is the subject of steady inquiry and producers are well sold, while a strong market is again reported for arsenic with supplies being readily taken up. Glycerine is maintained at the controlled levels and finds a ready outlet for all available supplies. No change is reported from the coal-tar products market this week and a moderate amount of fresh inquiry has been received.

**MANCHESTER.**—Little change in the general price position of heavy chemicals on the Manchester market has to be recorded, but a strong undertone remains in evidence. To some extent new bookings, as well as the movement of supplies against existing orders, have been adversely affected by the annual stoppage of textile mills, and other chemical-consuming works, for holidays; though in spite of this delivery specifications for the general run of soda compounds and for a wide range of other products, including the acids, have been reported. The feature of the by-products market has been the steady call for supplies of creosote oil and anthracene oil, and most of the light distillates, on the basis of the controlled prices.

**GLASGOW.**—In the Scottish heavy chemical trade there is no change during the past week, home business remaining rather quiet owing to the number of works closed for the annual holidays. Export trade remains rather restricted. Prices continue firm.

# BONE ASH

PUREST AND FINEST

→ Highest Percentage of  
Tricalcic Phosphate

**CAFFERATA & CO., LTD.**

BEACON HILL, NEWARK, ENG.



## ***we can subtract a smell***

In many industrial processes it's important to have your substance minus its smell or minus its impurities, since it may be going into a food or drink or a beauty preparation.

Our Active Carbon can do more than deodorise, of course.

It can de-colourise. It can simplify crystallisation. It can improve colour and increase concentration. It can remove detrimental flavours.

It can clean precious liquids and gases. In other words it can remove the obstacles in the way of improving the quality and attractiveness of many products in every day use, and our advisory department will be only too pleased to assist the process.

**SUTCLIFFE  
SPEAKMAN**  
AND COMPANY LTD

LEIGH · LANCASHIRE

*London Office:*  
66 Victoria St., S.W.1. VICTORIA 7982-3

**THIRD EDITION  
of**

## **'ANALAR' STANDARDS FOR LABORATORY CHEMICALS**

This Edition contains 228 monographs, including the following substances which were not in the First and Second Editions :—

Ammonium dihydrogen phosphate  
Ammonium tartrate  
Cobalt oxide  
Ethyl acetate  
Hydrogen peroxide (100 volumes)

Sodium dihydrogen phosphate

Magnesium acetate  
Nickel nitrate  
Perchloric acid (72 per cent.)  
Potassium periodate  
iso-Propyl alcohol

In preparing the new edition many of the tests given in the text have been improved by making them more delicate and more definite.

**Price 5s. Od.**

**Postage extra.**

**THE BRITISH DRUG HOUSES, LTD.**  
GRAHAM STREET - - LONDON N.1

## BRITISH ASSOCIATION OF CHEMISTS

is a body of Chemists seeking to promote professional standards of unity among all chemists. ONE of its many activities is PROFESSIONAL DISCUSSION.

- In its Sections, Groups and Branches, chemists meet together to discuss professional problems.
- It seeks the fullest possible co-operation with all other organisations of chemists.
- It seeks to avoid "poaching on the preserves" of other bodies by confining itself to its own Special Trade Union Functions.

For particulars of Membership, write to:—

C. B. WOODLEY, 175, Piccadilly, C.R.A., F.C.I.S., London, W.1.  
General Secretary, B.A.C.

## EDUCATIONAL

### Great Possibilities for QUALIFIED CHEMICAL ENGINEERS

Key Men in Wartime and Afterwards.

MANY of the finest posts in Britain in Wartime are reserved for Chemical Engineers. The same will be the case when the war is over. The vast technique and experience now being applied to Chemical Technology for war purposes will then be suitably utilised in reconstruction, and in trade and commerce.

Enrol with the T.I.G.B. for A.M.I.Chem.E. Examinations in which home-study Students of The T.I.G.B. have now gained:—

THREE "MACNAB" PRIZES,  
including the "MacNab" Prize awarded  
at the last (1943) Examination.

Write to-day for "The Engineer's Guide to Success"—free, containing the world's widest choice of Engineering Courses—over 200—the Department of Chemical Technology, including Chemical Engineering Processes, Plant Construction, Works Design and Operation, and Organisation and Management—and which alone gives the Regulations for A.M.I.Chem.E., A.M.I.Mech.E., A.M.I.E.E., C. & G., B.Sc., etc.

THE TECHNOLOGICAL INSTITUTE  
OF GREAT BRITAIN,  
219 Temple Bar House, London, E.C.4.

## FOR SALE

CHARCOAL, ANIMAL, and VEGETABLE, horticultural, burning, filtering, disinfecting, medicinal, insulating—also lumps ground and granulated; established 1850; contractors to H.M. Government.—THOS. HILL-JONES, LTD., "Invicta" Mills, Bow Common Lane, London, E. Telegrams, "Hill-Jones, Bochurch, London." Telephone: 3285 East.

BOILER STORAGE TANKS		
4.	30' x 8'	Diameter
2.	28' x 7'	"
1.	23' x 7'	"
1.	20' x 5' 6"	"
2.	15' x 5'	"

EXCELLENT VESSELS SUPPLIED  
READY FOR USE

MADEN & MCKEE, Ltd.

317, PRESCOT ROAD,  
LIVERPOOL, 13.

Phone 98 Staines.

HEAVY toothed Crusher. Small Autoclave 4' x 27" Copper Vacuum Pan 40 Gals. Jacketted pan 3' by 3' 6". Six Open Tanks 5' 8" deep by 3' 9" diam.

HARRY H. GARDAM & CO. LTD.  
STAINES.

NON-SCRATCH POWDER CLEANSER—regular bulk supplies in bags. Write for sample giving approximate quantities desired. Box 2177, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

## Secondhand

### AUTOCLAVES AND PRESSURE VESSELS for sale.

HORIZONTAL all copper **AUTOCLAVE**, 6 ft. 3 in. long by 3 ft. 0 in. dia., with stirring gear, driven from belt pulley; horizontal agitating shaft running through glanded bolted-on end covers; 6 in. dia. opening in top.

Vertical lead lined high pressure **AUTOCLAVE** or **ACID EGG**: mild steel casing 4 ft. 8 in. deep by 3 ft. 0 in. dia., lined 4 in. lead; fitted massive hinged lid arranged 14 quick-acting swing bolts: various connections.

Horizontal high pressure steam jacketed stirred **AUTOCLAVE** by Lennox Foundry: cast iron body 4 ft. 4 in. long by 2 ft. 0 in. dia., with mild steel jacket; cast iron bolted-on end cover with glanded agitator shaft carrying heavy stirring blades, direct driven from f. and l. pulleys.

Horizontal steam jacketed stainless steel lined **AUTOCLAVE** or **PRESSURE VESSEL**, 4 ft. 0 in. long internally by 1 ft. 8 in. dia., fitted stainless steel hinged door with strong backs and hand wheel tightening; various connections and pressure gauge; suitable for low pressures only.

Vertical mild steel riveted **VACUUM** or **PRESSURE AUTOCLAVE**, 3 ft. 4 in. deep by 1 ft. 11 in. dia., fitted hinged lid secured by four quick-acting swing bolts; 2 in. connections, one fitted with non-return valve.

Vertical enclosed **PRESSURE AUTOCLAVE** or **MIXER**: cast iron copper lined pan 2 ft. 0 in. deep by 3 ft. 0 in. dia., dished bottom and domed cover secured by quick-acting clamps; glanded vertical agitating shaft driven through gearing from f. and l. pulleys.

All copper spherical **HIGH PRESSURE AUTOCLAVE**, 4 ft. 0 in. dia., shell approx. 1 in. thick copper; 8 in. dia. manhole and sundry screwed connections.

Vertical mild steel **COOKING RETORT**, 6 ft. 4 in. high by 3 ft. 6 in. dia. inside, with lid fitted ten swing clamps; mounted on supporting feet; 3 in. bottom run-off.

GEORGE COHEN, SONS & CO., LTD.,  
STANNINGLEY, near LEEDS and  
WOOD LANE, LONDON, W.12

PUMP, Vertical, 3 Throw, by Bailey: 10 in. Plungers by 14 in. Stroke, geared belt drive. THOMPSON & SON, (MILLWALL), LTD., Cuba Street, Millwall, London, E.14. East 1844.

REBUILT Hydro Extractors by all leading makers from 18 in. upwards with countershafts attached and safety covers. Jacketed Steam Pans, various sizes. List on request. Seen at Randalls, Arundel Terrace, Barnes. Telephone: Riverside 2436.

1000 STRONG NEW WATERPROOF APRONS. To-day's value 5s. each. Clearing at 30s. dozen. Also large quantity Filter Cloths, cheap. Wilsons, Springfield Mills, Preston, Lancs. Phone 2198.

## SERVICING

GRINDING of every description of chemical and other materials for the trade with improved mills.—THOS. HILL-JONES, LTD., "Invicta" Mills, Bow Common Lane, London, E. Telegrams: "Hill-Jones, Bochurch, London." Telephone: 3285 East

## SITUATION WANTED

YOUNG MAN, age 27, seeks situation as a chemist, in or near London. Experienced in Analytical and general chemical work, also four years experience large Metallurgical firm and four years retail Pharmaceutical trade. Exempt military service. Box 2175, THE CHEMICAL AGE, 154, Fleet Street, E.C.4.

## WANTED

WANTED.—Supplies of Nitre Cake in ten-ton lots. Box No. 2126, THE CHEMICAL AGE, 154 Fleet Street, E.C.4.

AUC  
EDW  
Auct

The  
sho  
tise  
ind

**AUCTIONEERS, VALUERS, Etc.**  
**EDWARD RUSHTON, SON AND KENYON**  
 (Established 1855).

Auctioneers' Valuers and Fire Loss Assessors of  
 CHEMICAL WORKS, PLANT AND  
 MACHINERY,

York House, 12 York Street, Manchester.

Telephone: 1937 (2 lines) Central, Manchester.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.



**BULK MATERIALS**  
 for bona-fide Manufacturers and Packers  
**FOR RESALE**  
**UNDER OWN BRAND**

We are actual makers of bulk proprietary products for some of the largest and best known manufacturers in the country. All transactions are in strict confidence.

A brief selection is given below:

• CALOMEL DUST 4% • DISINFECTANTS (all types) • DERRIS DUST • NICOTINE INSECTICIDE • RAW NICOTINE 95.96% • DOMESTIC INSECT SPRAY • DOMESTIC & FARM INSECT POWDER (Non-poisonous) • LIQUID MANURE (Concentrated and odourless) • LIME-SULPHUR • DETERGENTS (all types) • NON-SCRATCH SCOURING POWDER • BOILER DE-SCALERS • FOAM INHIBITORS • ACID PICKLING INHIBITORS • AMMONIA LIQUOR • SOAP-LESS SPREADING AND WETTING-OUT COMPOUNDS FOR THE MANUFACTURE OF WASHING POWDERS AND FLUIDS, AND TOILET ARTICLES • SILICA FILLERS FOR THE RUBBER, LINOLEUM, FERTILISER AND SOAP INDUSTRIES.

Some items are at present subject to wartime control. Others are free of restriction, but in short supply.

Your enquiries are invited.

**ORMSKIRK FERTILISER CO.**  
 (INDUSTRIAL CHEMICALS)  
 BURSCOUGH BRIDGE ORMSKIRK  
 Tel.: Burscough 2171 and 2172

# BAKELITE

Not only before this war, but during the war 1914-1918 our chemists were on research to improve BAKELITE for Government requirements. For some years afterwards the most important War Department using Bakelite demanded all of our product—and would use no other.

We lent our chemist, "Doctor Heineman," to America. His assistant is still with us. We then engaged, for special research, Doctor Alfons Ostersetzer, of Vienna (from Italy, where he had fled to escape Hitler), and have since loaned Doctor Ostersetzer to the Canadian Government War Department for special research on Bakelite Varnishes, and he has this last month been loaned to the U.S. Government for the same purpose.

We, Attwaters, have always during the 70 years of our existence in business, actively worked to improve our products.

**ATTWATER**  
**& SONS, LTD.**  
**PRESTON, LANCS.**

**TANKS, PANS, TOWERS,  
PUMPS, ETC.**

Built in Tantiron, Lead, Keebush and  
non-ferrous metals.

**Lennox** Foundry Co. Ltd.

Glenville Grove, London, S.E.8

Specialists in corrosion problems

**"LION BRAND"  
METALS AND ALLOYS**

MINERALS AND ORES  
RUTILE, ILMENITE, ZIRCON,  
MONAZITE, MANGANESE, ETC.

**BLACKWELL'S  
METALLURGICAL WORKS LTD.**  
GARSTON, LIVERPOOL, 19

ESTABLISHED 1869

**RUBBER FRICTION  
SURFACE BELTING &  
ENDLESS VEE ROPES**

of

Superlative Quality

Large Stocks - Prompt Despatch

**FRANCIS W. HARRIS & Co. Ltd.**

BURSLEM - Stoke-on-Trent

Phone Stoke-on-Trent 7181.

Grams: Belting, Burslem

**CHEMICAL LEADWORK**

TANKS — VATS — COILS — PIPEWORK

**W. G. JENKINSON, Ltd.** Telephone 22473

156-160, ARUNDEL STREET, SHEFFIELD

**"ZULO"**



**CARBOY HAMPERS**

**LEIGH  
& SONS  
METAL  
WORKS**

Orlando St.  
BOLTON.

**TRIBASIC PHOSPHATE OF SODA**

**Free Running White Powder**

Price and sample on application to:  
**PERRY & HOPE, LIMITED**, Nitshill, Glasgow

**SWIFT  
& COMPANY PTY. LTD.**

Specialising in

INDUSTRIAL CHEMICALS, SOLVENTS,  
PLASTICS, AND MATERIALS FOR MANU-  
FACTURING INDUSTRIES THROUGHOUT  
AUSTRALIA AND NEW ZEALAND.

Open to extend connections with

**BRITISH MANUFACTURERS**

Head Office: 26/30, Clarence Street, Sydney, N.S.W.  
and at  
Melbourne, Adelaide, Perth, Brisbane and Wellington  
N.Z.

Cable Address: SWIFT, SYDNEY

Bankers: Bank of New South Wales, Sydney and  
London.



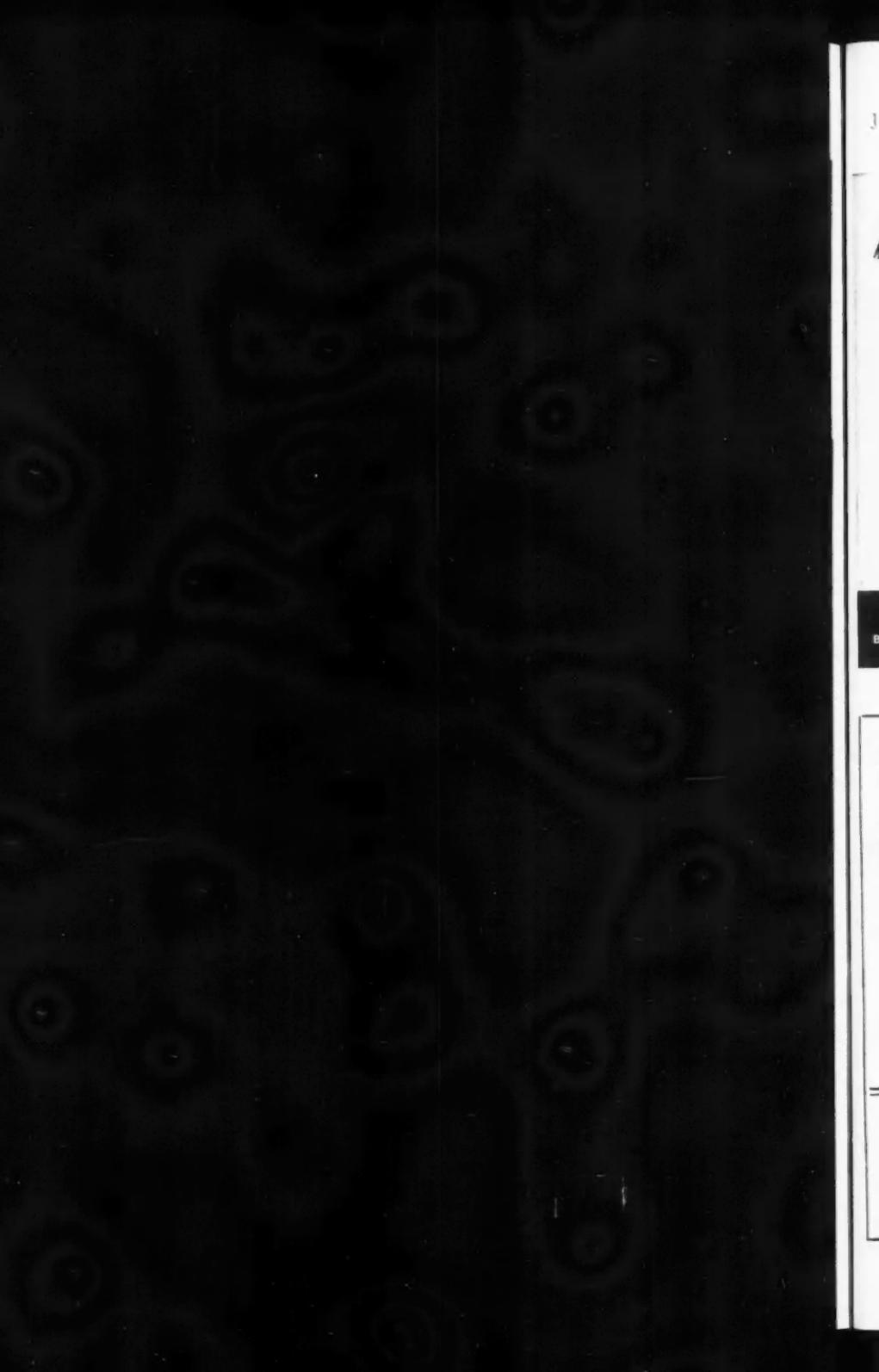
**DISCOVERY**

keeps you informed  
on everyday science  
with popular arti-  
cles and news by  
leading authorities

16 MONTHLY  
19/- annual subscription

**EMPIRE PRESS  
NORWICH**





# Pumps



FOR ALL  
PURPOSES  
HAND, BELT,  
ELECTRIC MOTOR  
or  
ENGINE DRIVEN

Illustrating one of our  
Small Portable Rotary Pumps

WE SPECIALISE IN PUMPS FOR VISCOS MATERIALS  
BARCLAY KELLETT & Co. Ltd., BRADFORD, Yorks.  
Pump makers since 1882

PROMPT DELIVERY  
AND  
LOW PRICES

**PRECIP. CHALK**  
HEAVY

**FRENCH CHALK**  
SUBSTITUTE

**KIESELGUHR**  
(WHITE CALCINED)

**W. R. LUSCOMBE**  
LTD.  
46a DRAYTON GARDENS,  
LONDON • N.21

Phone: LABurnum 3032.  
Grams: Obsidian.  
Phone: London.

## CALLOW ROCK

High-Calcium

# LIME

for all purposes

• • •

## QUICKLIME

(Calcium Oxide)

of the highest commercial quality  
in lumps or in coarse powder form

## HYDRATED LIME

(Calcium Hydroxide)

In Standard and Superfine grades to  
meet most industrial requirements.

• • •

The Callow Rock Lime Co. Ltd.

CHEDDAR, Somerset

use...

## ACTIVATED ALUMINA

(BRITISH MANUFACTURE)

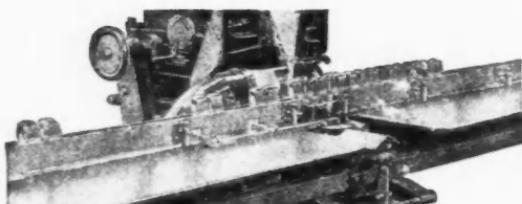
of high adsorptive  
efficiency, for dehydration  
of gases and liquids, oil  
refining and air  
conditioning, and as an  
effective catalytic agent  
for many chemical  
reactions...

ALL ENQUIRIES TO—  
**PETER SPENCE & SONS LTD.**  
NATIONAL BUILDINGS • MANCHESTER 5  
TELEGRAMS: SPENSERITY 4101 • NUMBER 8888 SALINGO

© 2A

# JACKSON-CROCKATT

## FILLING and GRANULATORS PACKING MACHINES



SPECIAL AUTOMATIC MACHINES • CONVEYORS  
and FACTORY EQUIPMENT

J. G. JACKSON & CROCKATT LTD.

DARNLEY STREET • GLASGOW

Phone: SOUTH 2861

"STILL LEADING"

For CHEMICAL & ALLIED TRADES

ACID RESISTING  
CEMENTS & LININGS

For PICKLING TANKS, FLOORS,  
DIGESTERS, KIERS,  
STONE, CONCRETE,  
BRICK, WOOD  
AND IRON  
VESSELS



*PICKLING TANKS 30 FEET LONG WORKING SUCCESSFULLY  
AN ALL BRITISH PRODUCT*

**RIZISTAL**

RESISTS

Formaldehyde,  
Alcohol, Oils, Greases  
and Tar Acids, Benzene,  
Toluene Compounds HCl,  
 $H_2SO_4$ ,  $HNO_3$ , and  $H_3PO_4$ ,  
mixed  $HNO_3$  and HF Acids,  
Aqua Regia, Formic, Acetic, Lactic,  
Oxalic, Chromic Acids, Bisulphites,  
Hypochlorites, Mixed Acids, Nascent  
Halogens and Alkalies.

UNDER STEAM PRESSURES  
OVER 40 YEARS' EXPERIENCE

JOHN L. LORD  
WELLINGTON CEMENT WORKS  
TELEGRAMS "CEMENT"  
PHONE BURY 117 & 1168  
BURY, LANCASHIRE

